THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

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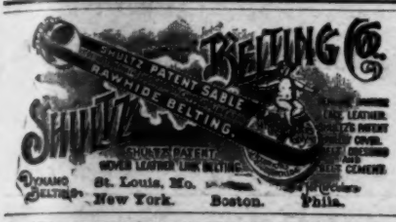

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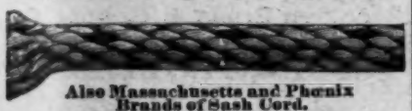

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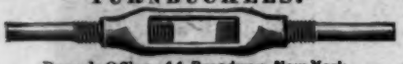

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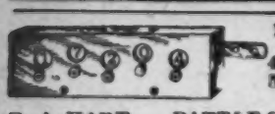
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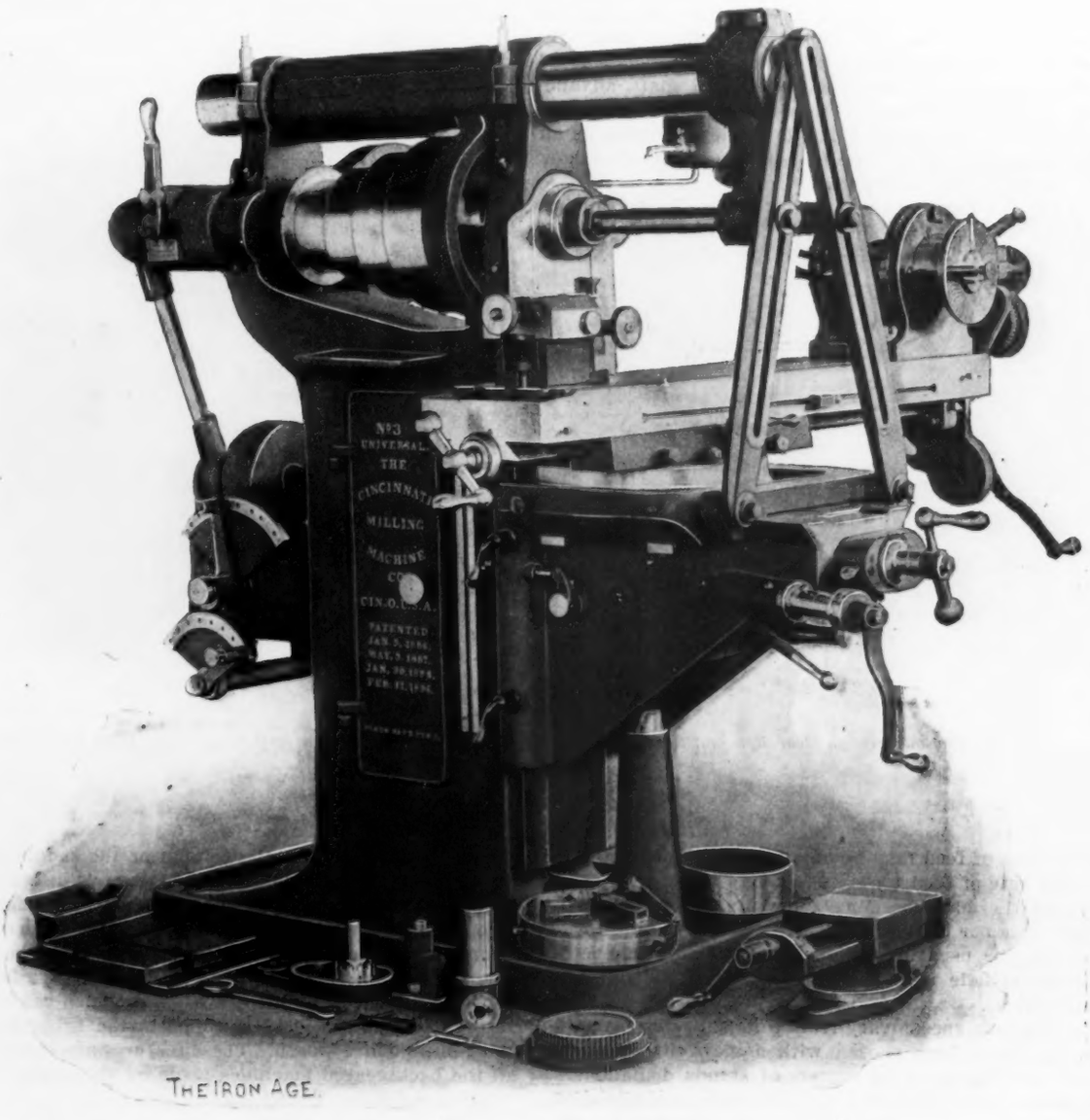
THE IRON AGE

THURSDAY, NOVEMBER 21, 1901.

The Cincinnati Milling Machine.

The Positive Feed Mechanism.

The accompanying illustrations show the latest pattern milling machine made by the Cincinnati Milling Machine Company of Cincinnati. The chief characteristic of the machine is the positive feed mechanism, which is shown in detail in Figs 2, 3, 4 and 5. The features incorporated in this construction are, *a*, a positive gear driven feed; *b*, a wide range of feed changes; *c*, means for changing from any one rate of feed to any other rate of feed conveniently and without stopping the machine.



THE NEW CINCINNATI MILLING MACHINE.

Part of the mechanism is placed at the rear end of the milling machine spindle and part is incased in a gear box at the rear of the column. The connection between these two parts is by means of a vertically inclined shaft. Figs. 2 and 3 show, respectively, a section through the upper gear box and the upper gear box complete on the column of the machine, while Figs. 4 and 5 show, respectively, a rear view of the lower gear box, with covers removed, and a front view of the same mechanism indicating the arrangement of the shifting levers.

The operation of the mechanism is briefly as follows, referring to Fig. 2: Motion is transmitted to the shaft B by sliding the gears on B so as to bring either one of them into mesh with the proper gear on the spindle, or the gears may be set in the intermediate position, shown in the sectional drawing, in which case no motion is imparted to B. This position of the gears throws out the entire feed mechanism. The shaft B drives the vertically inclined shaft M, which in turn drives the shaft in the lower gear box upon which are mounted the spur gears R and S, as shown in Fig. 4, through the miter gears at G, which are of steel, case hardened. All the spur gears of the feed mechanism are of steel. Inside of the lower gear box will be seen two cones of four gears each, running loose on their shaft and driven inde-

pendently by the gears R and S, the smaller gear, R, engaging the largest gear on one cone and the larger gear, S, engaging the smallest gear on the other cone, thus imparting widely different speeds to the two cones. From these cones motion is transmitted to the various feed screws through an intermediate gear, which is made to slide on its shaft by means of the rack and sector, and placed into correct position for engaging any one of the cone gears by means of the lever which actuates the sector. This is the lower lever shown in Fig. 5. The position of this lever at any time indicates the rate at which the machine is feeding in thousandths of an inch per revolution of spindle by means of raised figures on the lever quadrant.

The lower lever having been placed in position to obtain the desired rate of feed, the intermediate gear is brought into mesh with the proper cone gear by the upper lever in Fig. 5, which moves the entire lower portion of the mechanism. This is accomplished by means of a helical groove in the hub of the lever, which engages a pin in the slide, upon which are mounted the lower lever, sector, rack and intermediate gear. By means of the combination of these two mechanisms 16 different speeds are imparted to the feed shaft, advancing by even graduations from 0.006 to 0.300 inch for each turn of the spindle. The lower lever, acting as an indicator, enables any one to tell at a glance just how fast the machine is working.

From the foregoing it is plain that by simply shifting the levers on the feed mechanism any one of the 16 different rates of feed may be obtained, and a change from any one rate of feed to any other may be made without stopping the machine, since there are no change gears to interpose nor belts to shift. Any one of these rates of feed may be used in combination with any of the 16 different spindle speeds, providing in all 256 different combinations.

The spindle speeds vary from 9 to 350 turns per minute, and have been chosen with a view to secure the proper cutting speed for cutters of standard diameters. The table shows how well this has been accomplished, and also shows how these speeds are obtained for the No. 3 universal machine.

Table of Cutter Diameters Adapted to the Spindle Speeds Furnished on the No. 3 Universal Cincinnati Miller.

	Surface speeds.—Feet per minute.—		
Spindle speeds.	Steel, 20 feet. Cutter diameter.	Cast iron, 40 feet. Cutter diameter.	Brass, 60 feet. Cutter diameter.
9	8½	....	....
13	6	12	....
15	5	10	....
19	4	8	12
22	3½	7	10
30	2½	5	7½
34	2¼	4½	6¾
51	1½	3	4½
60	1¼	2½	4
88	⅞	1¾	2⅝
103	¾	1½	2¼
133	⅝	1¼	1⅞
150	½	1	1½
203	⅜	¾	1⅛
230	⅜	⅝	1
350	¼	½	¾

It may not be out of place to emphasize a few of the advantages of this particular mechanism. With it the capacity of the machine for removing metal is only limited by the pulling power of the main driving belt. The rate of feed can be changed practically instantaneously. It is positive at all times, imparting an even motion to the table, thereby avoiding the broken cutters and spoiled work which so often result from a slipping feed belt.

In addition to this new feed mechanism there are other improvements on these machines, notable among which are a telescopic vertical feed screw, which does away with the necessity of cutting a hole through the floor.

There are clamping devices which enable one to firmly lock the knee to the column or the saddle to the knee when the longitudinal feed alone is being used, thereby greatly increasing the rigidity of the machine. The sliding covers on the knee protect the feed screws from dirt and cuttings, and a cylindrical overhanging arm, which, in addition to the regular support for the arbor, is also provided with a support which can be adjusted close to the center, supports the arbor at any point in its entire length. These features are common to all the back geared machines made by this company.

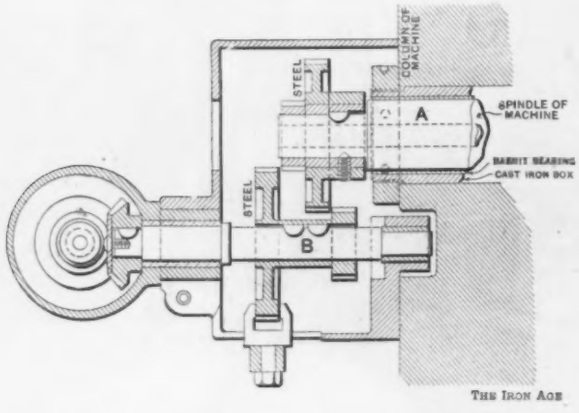


Fig. 2.—Section through Gear Box and Spindle.

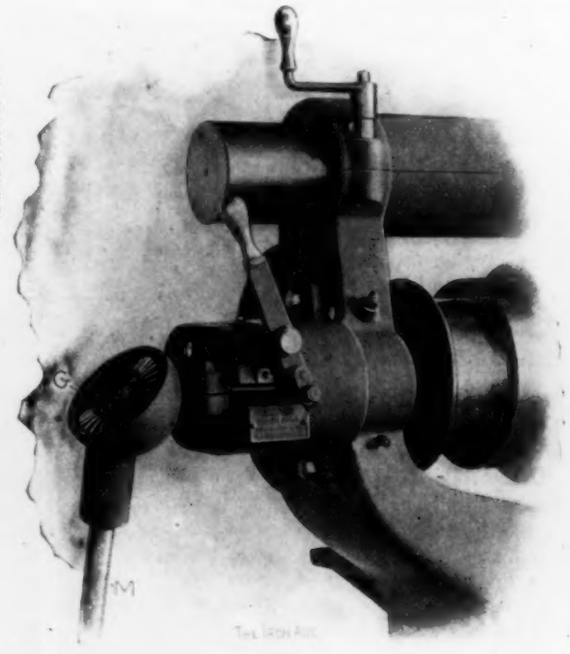


Fig. 3.—Upper Gear Box with Cover Over Miter Gears Removed.

THE NEW CINCINNATI MILLING MACHINE.

Keystone Driller Company.

The Keystone Driller Company, Beaver Falls, Pa., began operations at Fallston in 1882 under the name of the Keystone Portable Steam Driller Company, Limited, and in 1891 were incorporated under the laws of Pennsylvania, with a capital of $150,000, under the name of Keystone Driller Company. Their business has grown rapidly and some recent improvements and additions have been made, which will about double the capacity of the plant. Two buildings, 40 x 200 feet, part of which are two story, and one 60 x 100 feet, have been built, and a new brick office, 30 x 40 feet two stories high, is being erected and will be ready by January 1. The company recently increased their capital stock from

$150,000 to $300,000. They build machinery for testing gravel beds for gold, also for minerals, such as lead, zinc and coal, and also make drills for oil and gas wells. Under construction at the present time is a large portable engine, which is intended to drill to a depth of 2500 feet, which will be completed in about two weeks and will be tested by the Keystone Driller Company in putting down a gas well for their own works. The officers of the company are D. McAllister, president; R. M. Downie, secretary, and R. G. Forbes, treasurer.

Central Pennsylvania News.

HARRISBURG, PA., November 19, 1901.—Among the charters granted at the State Department yesterday was one to the Alan Wood Iron & Steel Company of Philadelphia, with a capital of $1,250,000. This company will take in all of the Alan Wood mills at Conshohocken, near Philadelphia.

The York Bridge Company have asked for plans and bids for an extension to their plant at York. It will be for the shaping of structural steel and manufacture of material which the company formerly bought from other bridge companies.

The Susquehanna Iron & Steel Company propose to provide for the building of their new pipe mill by the issue of $300,000 in bonds. The mill will be erected this winter at Columbia.

The Middletown Car Company have been formed by Arthur King and others to operate the Middletown Car Works at Middletown. The capital is $100,000. There are several orders of good size on hand and work will be brisk throughout the winter. A number of improvements are to be made.

The new Mann axe factory at Mann, near Lewistown, has been started by the owner, James Mann, formerly of the American Axe & Tool Company. The capacity is 50 dozen axes per day.

Since the South Harrisburg works of the Standard Chain Company have changed from electricity to steam for power the works have been running regularly and there is a great deal of business being done. The plant is now working 37 fires and large orders for the South are being filled.

The American Steel & Iron Mfg. Company are improving their plant at Lebanon, notably in power. The Lebanon works have been very busy.

Newspaper reports of trouble at the Duncannon Iron Company's works are baseless. The works are in operation in all of their branches.

A new foundry will be put into operation by the Harrisburg Mfg. & Boiler Works this winter. It will have two cupolas.

Officers of the Central Iron & Steel Company at Harrisburg say that plans are being drawn for the erection of an open hearth steel plant, despite rumors to the contrary. S.

Fischer Foundry and Machine Company.

The Fischer Foundry & Machine Company, located on the South Side, Pittsburgh, engaged in building rolling mill machinery and engines, have decided to make some large additions to their present works. The company have been incorporated under the laws of Pennsylvania with a capital of $200,000, and at a meeting to be held soon, for the purpose of effecting a permanent organization under the new charter, the capital stock will be considerably increased. At this meeting to organize Fred. F., H. B., George L., Jr., and Albert Fischer will be elected as the Board of Directors. Fred. F. Fischer will probably be elected president and H. B. Fischer secretary, holding the same offices as in the present organization. George L. Fischer, Sr., is now treasurer of the company, who for some time have been doing business as the Fischer Foundry & Machine Company, and at the organization meeting he may relinquish this office. The company have just placed on the market new grinding and polishing machinery for plate glass works, for which they expect a large demand. They have also received a large contract for machinery for the new tube mill now being built by the Sharon Steel Company, at Sharon, Pa. They are filling large contracts for equipment for the new plate mills of the Cambria Steel Company, Jamestown, Pa., and also for the new billet mill of the Republic Iron & Steel Company, at Youngstown, Ohio. Sufficient orders are now on their books to keep them fully employed until April of next year.

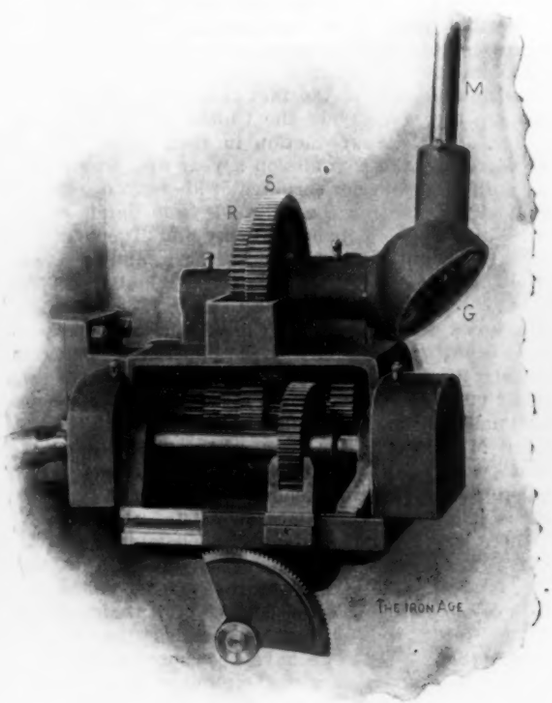


Fig. 4.—Lower Gear Box with Covers Removed.

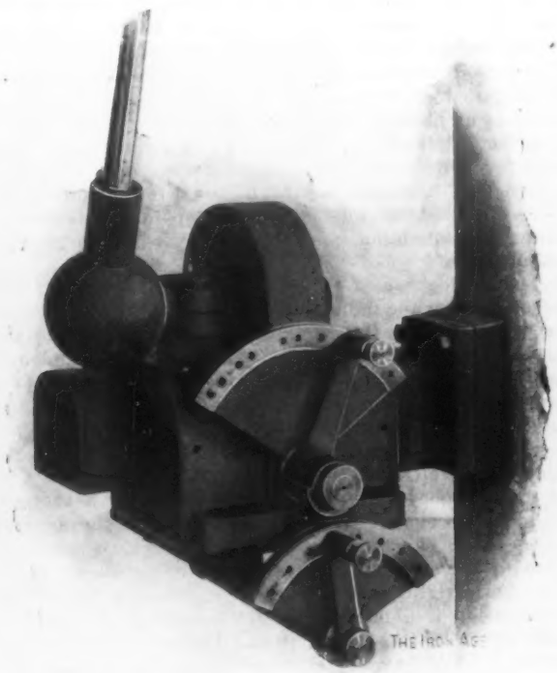


Fig. 5.—Front View of Lower Gear Box, Showing Shifting Levers.

THE NEW CINCINNATI MILLING MACHINE.

The Minnesota Ore Railways Decision.

DULUTH, MINN., November 18, 1901.—After a series of legal battles running over four or five years the iron ore railways of Minnesota have won a great victory in the admission by the State Railway Commission that their traffic is interstate and not within its province for the regulation of rates.

In other words, all iron ore that originates in Minnesota and is destined to points outside the State is not intrastate commerce, even though the entire rail haul is within the confines of one State, and even though the rail rate to the edge of the State is constant and unchanged and the lake rate from the edge of the State to points beyond is fluctuating; but it is interstate commerce and therefore under the jurisdiction of the Congress of the United States. Of course all ore destined from the Minnesota ranges to points within the State is intrastate commerce and as such is subject to the rules of the State Commission. The roads admitted at the time of their contention that all other traffic was interstate, and at that time, July 9 last, they withdrew all other tariffs and filed an intrastate tariff on ore to Missabe Junction on the Duluth, Missabe & Northern Road and to Duluth on the Duluth & Iron Range Road. This tariff is in force and is subject to the orders of the State Commission. But as there is at present admittedly no market in all Minnesota for a pound of iron ore, and as all that has been sold for delivery within the State since iron has been mined here has been less than 50,000 tons, while there have been 57,000 tons shipped to points outside the State, this admission is a matter of very slight present importance.

In the decision of this week two of the State Commissioners, while admitting their lack of jurisdiction over rates on ore billed through to points outside the State, or so destined when loaded, were still of the opinion that they might have authority over ore of shippers not controlling both the rail and lake transportation, and made an order calling for the filing of tariffs on all ore destined to the docks and "destined to points within the State" by which they meant the docks themselves. One of the commissioners dissented, saying that "if the conditions shall change so that shipments to or through the docks are or can become State shipments then it will be time to file such an order." There is no question but that he is right, and the order of the majority of the commission is a mere political subterfuge, designed to take off from the clear cut and sweeping decision the effect it may have upon future State politics. If the traffic in ore is interstate when over the roads to docks and by one line of ships to Eastern States it is clearly the same when over these roads and by another line of ships to the East, the fact that it may not go on a through bill of lading or under a through rate in one case having no real bearing on the situation. So that there is not the slightest question but that Chairman Mills' position is the consistent and legal one, if the main contention is correct. This phase is merely technical, however, as there is not and cannot be a pound of ore carried over the docks into Minnesota.

That the main question is absolutely correct and that the State has no jurisdiction on traffic within its borders that is destined by a different method of conveyance and a varying rate and ownership of such conveyance to points without the State is shown by abundant authorities. It is one of the most interesting phases that has arisen in the annals of interstate commerce. It is very evident that the Minnesota State Commission would not deny its own authority in such a matter, by far the most important railway rate question that has ever come before it, except after the most searching inquiry backed by abundant and expert advice. That it has taken this idea into consideration is shown by the counsel called into the case, all of whom take the position that the State has no standing. These include the present Attorney-General, the First Assistant Attorney-General, the ex-Attorney-General and United States Senator M. E. Clapp, who was the State's special counsel in the hearing. All coincide with the eminent attorneys for the railroads, who made their argument last July.

The meat of this decision lies in the situation. The two roads that were cited to file their tariffs and ordered to reduce them 25 per cent. operate railroads running from the various iron mines of Minnesota to the lake front within the State, where they have built docks extending out into the navigable water of the United States for the conveyance of ore from cars to vessels. There is no way in which this ore, once on ship, can be unloaded in Minnesota except at a prohibitory cost and with great difficulty. In point of fact no ore once on board ship has ever been unloaded within the State. The roads contended that their ore business, running to these navigable waters, and their charge including the delivery upon ship in navigable waters of the United States, was interstate, though their tariff was "from mines to dock," and though the rate on ship might be what it would, and the ship might be secured by the ore shipper or owner, indeed might in many cases be his own property. They showed an actual through rail and lake rate to the East on ships of joint ownership, in which the rail rate was the same as in all other shipments, and they cited a great mass of evidence from other cases and of rulings by the highest courts in support of their contention. Probably in no case that has come before the State or Interstate Commission has there been such a sharp line of cleavage and such a clear cut situation on this point as in this, and the case will have the greatest importance on subsequent action in interstate commerce.

It is notable, too, in the fact that both the roads affected are the property of the United States Steel Corporation, and that a reduction in their rates, such as was ordered by the commission a year ago, would have made a difference in net earnings of about $2,000,000 per annum. The case for the railroads was handled with great ability by G. Welwood Murray and Joseph B. Cotton for the Duluth, Missabe & Northern, and by Frank B. Kellogg and J. H. Chandler for the Duluth & Iron Range.

There is a great deal of very loose talk in reference to this decision. It is claimed to be appealable; being an administrative order it is clearly not so. It is even said to be a victory for the State. It is claimed that it sounds the "knell of the independent operator," and that it "places Minnesota in the grasp of the trust." On these points I venture these statements, based upon a rather complete and intimate personal knowledge of the situation as it exists to-day and has existed for years. 1, that there is more independent or noncombination mining than at any time in the history of the State; 2, that there is more exploration for ore by independent and outside companies, connected neither with the roads nor with the United States Steel Corporation, than ever in the past; and 3, that there have been more sales of ore properties in comparison with the number to be sold and at higher prices and to a wider circle of buyers since the formation of the United States Steel Corporation and their complete control over the rail transportation situation than since mining and exploration began in Minnesota, and that private and State ore lands are worth more than ever. D. E. W.

Pittsburgh Coal Company.—The fourth quarterly report of the Pittsburgh Coal Company's Employees' Association, which includes proceedings up to October 31, has been issued. The association was organized a year ago to arouse an interest among the employees in the investment of their earnings in the stock of the corporation, and making them become stockholders in the concern. Up to the end of the quarter the report shows that among the miners 528 have become purchasers of the company's shares. They have taken on installment 2616 shares. Employees in the shops and railroads of the company have bought 88 shares. In the general offices 144 employees have purchased 2305 shares, and in the outside districts 73 purchasers have secured 586 shares. All of the shares secured are preferred stock with earning power of 6 per cent. The entire holdings are in the treasury of the association and amount to 6200 shares, which were secured at the market value of $92.87½ per share.

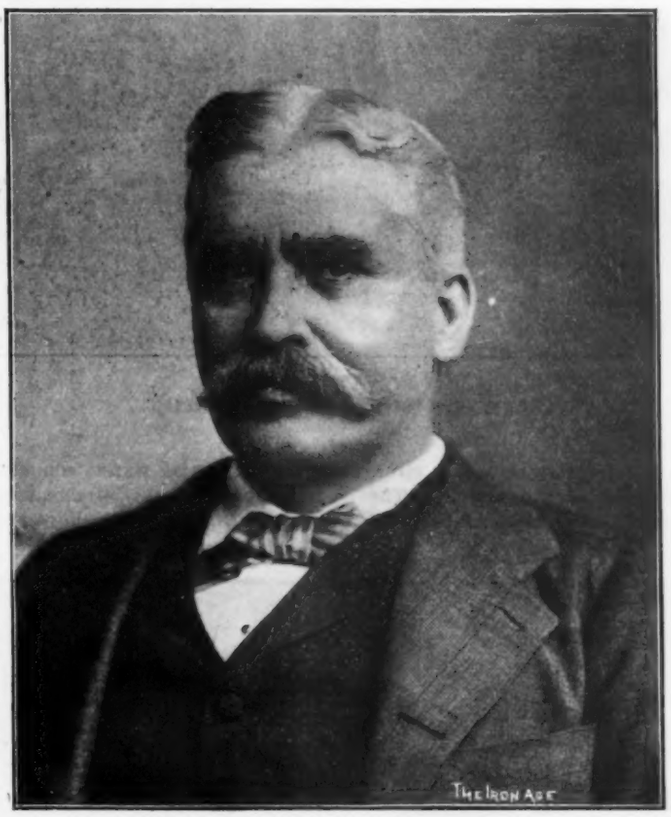
Robert Field has moved his office from Columbus to 46 Mitchell Building, Cincinnati, Ohio, where, in addition to the product of the Sloss-Sheffield Steel & Iron Company, of which company he is sales representative, he will have a full line of Northern foundry and malleable iron and foundry coke.

VANDERGRIFT,

A Workingman's Paradise.

[With Supplement.]

The betterment of the workingman's condition is not a new idea. Many projects have been devised with this aim in view. Some of them have been fairly successful, while others have been dismal failures. The cause of these failures has not always been the same, but probably more can be traced to an imperfect comprehension of human nature by the projector than to any other single reason. Philanthropy is by no means a rare virtue, every community being blessed with individuals who are sincerely desirous of lightening the burdens and alleviating the distresses of their fellow creatures. But well meaning efforts in this direction are frequently of little practical value from a worldly point of view. The recipients of philanthropic attentions, who are not purely objects of charity, may accept the benefits of proffered assistance in bettering their condition, even if obligations are imposed upon them, but in time they will chafe under the feeling that they are being thus treated for an ulterior purpose and that they are losing their manly independence. As an example of a well conceived plan for the improvement of workingmen, for enabling them to enjoy to probably the fullest possible extent the blessings, comforts and even luxuries of life compatible with the circumstances of wage earners, at the same time affording them perfect independence of action and the opportunity to develop individuality, the town of Vandergrift presents an unusually interesting study to the sociologist. It has been the extreme pleasure of a representative of *The Iron Age* to visit this town and to gather some facts concerning it, which are herewith presented, together with a number of illustrations.



GEORGE G. McMURTRY,

The Founder of Vandergrift.

How It Came Into Existence.

Vandergrift is located 38 miles east of Pittsburgh on the West Pennsylvania Railroad. It is in the beautiful valley of the Kiskiminetas, almost surrounded by thickly wooded hills. Here a tract of gently sloping ground, comprising 640 acres of farm land, was purchased a few years since by the Apollo Iron & Steel Company, now the American Sheet Steel Company, whose operations at Apollo, a short distance further up the river, had outgrown the space available for their works. Ground was broken for the new town in June, 1895, and simultaneously the construction of the new plant began. The first sheets rolled here were turned out on October 29, only four months after. The plant then consisted of 13 mills, but the business of the company speedily outgrew the capacity of the original works, and eight more mills were soon added, making 21. It was illustrated and described in *The Iron Age*, June 17, 1897. At present the construction of eight more mills is under way, so that the works will shortly have 29 in all. Nearly all the steel for these mills is produced in open hearth furnaces, which form part of the local plant. The annual output of finished product, which will be greatly increased when the new mills are completed, has been 130,000 gross tons of sheet bars, 105,000 net tons of black sheets, and 170,000 net tons of galvanized sheets. The large output of galvanized sheets is due to the fact that all sheets intended to be galvanized are brought to the Vandergrift plant from the other works of the American Sheet Steel Company in the Kiskiminetas Valley, located at Apollo, Leechburg, Saltsburg and Hyde Park. The relative importance of these works is shown by their pay rolls, the Vandergrift works paying out $1,500,000 per year in salaries and wages, Leechburg $390,000, Apollo $210,000, Hyde Park $200,000, and Saltsburg $150,000. The pay roll of the Vandergrift works will be increased 35 per cent. by February 1 next. It is the expectation of the management that this plant will continue to be enlarged, it being their ambition to make it a 50-mill plant. The arrangement of the buildings will enable this to be done without impairing the original relations of the several departments.

A Great Industry Builds Up a Large Town.

The foregoing historical and statistical statements have been made in this connection for the purpose of enabling the reader to get a comprehensive grasp of the situation. So large an industrial undertaking could not have sprung up in the time mentioned, and on what was a farm when the first sod was broken, without attracting a large population to its vicinity. The town of Vandergrift now contains over 6000 inhabitants. While a roll foundry and some minor establishments have recently located there, the dependence of the citizens is so largely based on the operations of the sheet mills that the latter must be closely considered in any observations made relative to the lives, habits and surroundings of the people.

When the managers of the Apollo Iron & Steel Company decided to build the new plant they also decided to lay out a town which would be so superior to the ordinary industrial settlement that it would attract a high class of workingmen. The financial benefits to accrue from the sale of lots were not overlooked, but this phase of the undertaking was made subordinate instead of paramount. The site selected was ideal. The mills were laid out on a comparatively level part of the tract. The ground set apart for the town slopes up gradually from the Kiskiminetas River, affording perfect conditions for

drainage. The services of Frederick Law Olmsted, the famous landscape gardener, were secured in making the plan of the town. He laid out wide streets, not crossing each other at right angles, but forming arcs of a circle gently curving with the contour of the ground. The plan provided for a number of small plots to be ornamented with flower beds or shrubbery. Thus the beginning was made for artistic effect, which seems to have been deeply impressed on the minds and habits of the people. The lots as laid out were of good proportions, with an alley running through the center of every block. A complete system of sewerage was installed, pipes were laid for gas and water, connections were run to every lot to prevent the streets from again being torn up, and the streets and alleys were then paved handsomely and durably with vitrified brick. It was intended from the beginning that the town should have no outhouses.

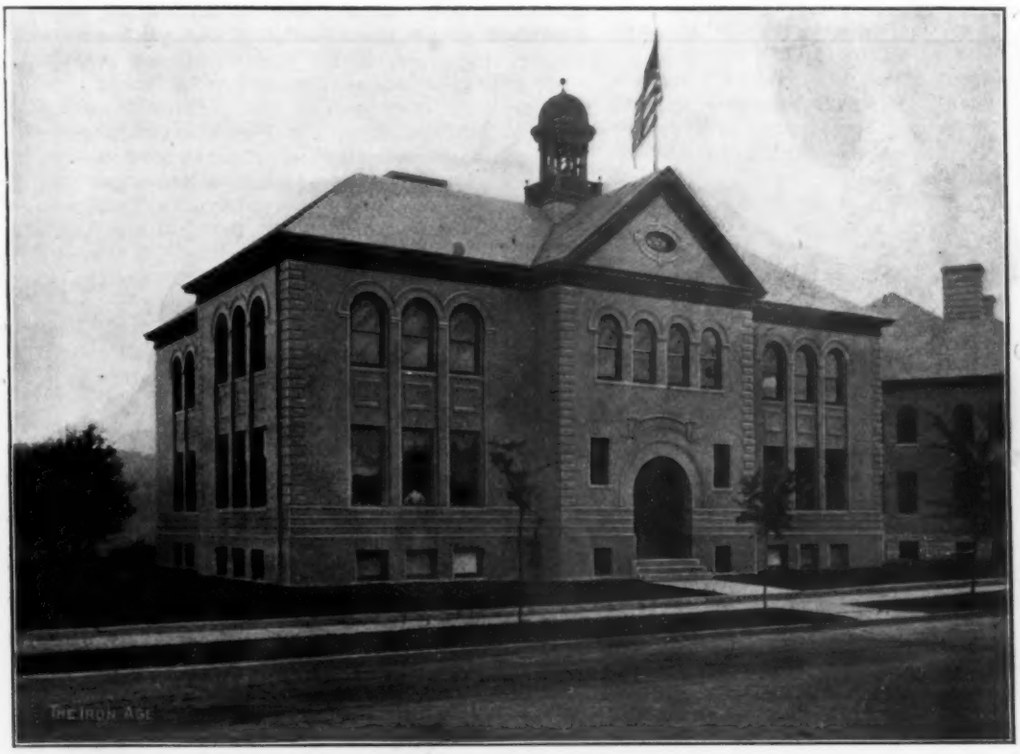
A BUSINESS BLOCK IN VANDERGRIFT.

CONTINUATION OF THE SAME BLOCK.

ITS WORKINGMEN'S HOMES.

Individual Tastes Consulted.

When all the preparations had been made, the men who expected to be employed in the mills were given the first opportunity to purchase lots. They had this preference for an entire week. The price made was the average price realized for five years for lots of the same size in the neighboring town of Apollo. No restriction was imposed on the purchasers save with regard to the sale of liquor. No liquor is permitted to be sold in the town. The lots were sold with no stipulation as to building lines or the character of the house to be built. Every man was permitted to be guided by his own taste. The company erected no houses and have none for rent, established no store and engaged in no branch of business outside of the manufacture of sheets, except such as were absolutely necessary in founding a new town. They organized a land company to look after real estate matters, as well as gas, water and electric light companies, but embarked in no line which brought them into competition with private enterprise. Further, no official, manager, superintendent or foreman can be interested in any business dependent to any extent upon the patronage of workmen. As soon as the workingmen purchased lots they consulted with their neighbors and established building lines or decided on uniform terraces in front of their houses where such were desirable. Instead of erecting plain or homely structures, they were inspired by their surroundings to study architectural graces, and numerous beautiful houses were built in the very infancy of the town. To-day it is one of the prettiest towns to be found anywhere. Every street is a revelation to the stranger who is familiar with other workingmen's towns. The houses are individualized, not built after a monotonous pattern. And they are tastefully and even artistically and luxuriously furnished. Nearly every house has its piano and its library, indicating the refining and elevating influences of the social life of the community. Every one, of course, has its own bathroom and other sanitary conveniences. The high character of the population is shown in the neatness with which the children are dressed.



THE VANDERGRIFT PUBLIC SCHOOLS.

Cheapness of Living.

The natural advantages of the locality add much to the charm of living in Vandergrift, which the workingmen themselves have named "a workingman's paradise." It is in a natural gas district, and every house uses this convenient fuel for cooking and heating, and sometimes for lighting, although electric light is generally used. Thus much of the labor and dirt incident to housekeeping are avoided. It is, further, only 3 miles from springs which have long been famous for the purity of their water. From these springs the supply of water is piped to the town. So excellent is the quality of this water that not a single case of typhoid fever has originated in the town from the date of its settlement. Coal is mined abundantly within a few miles and can be had cheaply for any purpose for which it may be required. The citizens thus enjoy great privileges, as may be seen from the statement made us by a housekeeper, whose house has ten rooms, all heated by a gas fired furnace in the basement, while all cooking and laundry work are also done with gas, that for four years the cost of his gas has yearly averaged $34.46; electric light, $16.83; water, $12.75, and taxes, $33.75.

The net rate for natural gas is 20 cents per 1000 cubic feet. The rate for electric light is 10 cents per 1000 watt hours, with a discount for prompt payment of 10 per cent. on bills under $4 and 20 per cent. on bills over $4 per month. The water consumed is measured by meter, the rates being based on the average rate of consumption for the preceding three months, ranging on a scale from 22½ cents per 100 cubic feet for 25 cubic feet per day to 6 cents per 100 cubic feet for 3000 cubic feet per day, with 10 per cent. discount for prompt monthly payment.

The citizens govern the town, which has been incorporated as a borough under the laws of Pennsylvania. The officers thus elected by them have charge of the schools, look after the peace and good order of the community, and supervise all public improvements. They have erected good school houses, raising money for that purpose by issuing bonds, the land company donating the ground. The company also donated ground for four churches when the town was started, stipulating that each should cost not less than $15,000, of which they further paid one-half. Since then several churches have been built by other denominations. The casino, which is a fine large building for public assemblies, was mainly built by the citizens. It cost $32,000, the company donating the ground and $14,000. In addition to assembly

rooms it contains reading rooms and a fine free library having 2500 volumes. It is understood that the gas, water, electric light and telephone companies will be turned over to the citizens of Vandergrift if they desire and are prepared for municipal ownership.

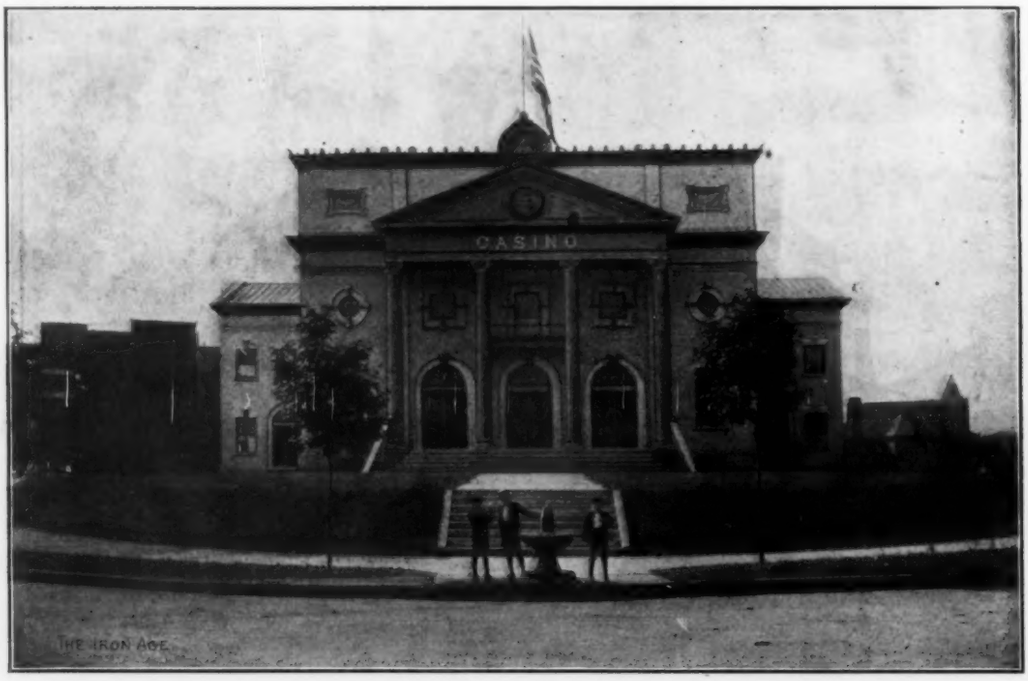
The Character of the Workingmen.

As before remarked, the aim of the builders of Vandergrift was to attract a high class of workingmen. This they have succeeded in doing. It is, however, a remarkable settlement of young people. It is believed that in it hardly a dozen persons can be found over 50 years of age. The skilled men employed in the mills, from superintendents down, will not average over 32. This has not been brought about by any forced arrangement, but probably demonstrates that young men are more likely to settle in a new locality than old ones. Further, the workingmen are largely natives of the locality, sons of farmers or of workingmen in nearby towns. It is believed that not over 10 per cent. are foreigners, and these are principally employed in the galvanizing department, where the character of the work is distasteful to men fitted for a more skilled vocation. Among such a high class of workingmen a general spirit of good fellowship is shown. They freely and willingly assist one another, their intercourse being remarkably free from discord. Here the influence of the management and the power of a good example are seen. It is a cardinal principle in the Vandergrift works that every man shall be treated as a man, whatever his station may be. If a roller has a difference with a scrap boy, the superintendent gives a hearing to both, and if the scrap boy has been unjustly treated the roller is compelled to make amends. Any man having a grievance is invited to make it known to the management, and if on investigation the complaint proves to be well founded the trouble is corrected. All superintendents, to the highest, know the men personally so as to be able to call them by name and take pains to speak to them. Thus a bond of friendship and mutual interest is created and sustained. In the center of the plant, on its own separate plot of ground, stands a completely equipped emergency hospital, in which a trained nurse can be found day or night, ready to attend any one suddenly taken ill or injured. In serious cases a surgeon is summoned and is on hand in five minutes.

The Wise Policy of the Management.

The well being and prosperity of a town depend upon the steadiness with which the workingmen are employed. The happiness found in Vandergrift would be far less if the heads of families earned a precarious living or worked in an establishment which closed at frequent intervals. The policy of the managers is to run uninterruptedly, recognizing practically but two holidays in the year—namely, the Fourth of July and Christmas. They do not even shut down the customary four or five weeks for repairs in midsummer or midwinter. The sheet mills run in three turns of eight hours each, the last turn for the week ending at 8 o'clock on Saturday morning. This affords ample opportunity to change rolls, make repairs, clean out mill pits, &c. The open hearth, bar mill and galvanizing departments are run on two daily turns of 12 hours each. Care is taken to give every man a full day of rest each week. Day and night millwrights are employed, and a general cleaning up takes place on Saturday, so that the machinery is always kept in good condition.

The men are paid on Friday, the money being taken to the mill and paid to each man wherever he is employed. He is not obliged to go to the office and stand in line. No roller pays the hands under him, but the company pay each man his own wages. Every one knows what is due him, as those who are paid on a tonnage basis receive a slip every day showing what they turned out the previous day, thus enabling them to check their accounts.



THE VANDERGRIFT CASINO.

The works at Vandergrift are free works, no union rules being tolerated. The consequence is that the lucrative positions in the works are open to all who show fitness. It may be said that civil service applies here. If a new roller is needed, a man from some subordinate position is promoted. No union is permitted to send an unknown man from another mill, to keep the craft of rolling confined to a select circle. The same methods apply throughout all departments. Men are advanced as they display merit or special aptitude, and worth receives its proper recognition.

It is not surprising that men working under these conditions and with these surroundings were unwilling to strike when the effort was made to "call" them out last summer. Among such men agitators and fomentors of strife can obtain no foothold.

To Whom the Credit is Due.

All this has been largely due to the personal influence of George G. McMurtry, president of the company, whose genius for executive responsibilities was so signally demonstrated in the growth of the Apollo works. He

saw that in the arrangement of that plant and of the town surrounding it many improvements were desirable for the betterment of the men employed, as well as for better results to the company. In studying this subject he visited many of the famous workingmen's towns in Europe, became thoroughly familiar with what had been done for workingmen, both abroad and in this country, and in time decided upon the methods which ought to be adopted in an American workingmen's town. They could not well be put in force at the old location, but could be at a new one. It was his desire to make his employees as comfortable and as happy as possible, and therefore he gave his personal supervision to the details. They realize this deep interest in their welfare and show their appreciation at every opportunity.

Glimpses of Mexico.

The Meeting of the American Institute of Mining Engineers.

Some years since the idea was broached of holding a meeting of the American Institute of Mining Engineers in Mexico, the members living in the sister republic heartily indorsing the plan. Circumstances made a postponement desirable, and it was not until this year that the arrangements were finally perfected. The applications filed were exceedingly numerous, but to many it proved impossible to carry out their plans. Yet it was quite evident at the outstart that a single train could not accommodate the party, and when the start was made members of the institute and their ladies, to the number of about 160, filled two trains of Pullman sleepers, which were as heavy as it would be possible to handle on Western and Mexican lines.

The statement is made by those who can lay claim to being authorities that the two trains made up for the party by the Pullman Company are the finest sent out on so long a run. The first section consisted of two baggage cars, a dining car, one compartment car, one four-drawing room and one two-drawing room car, an observation car and the private car of the president of the institute, the "Olympia," which was the car in which the late President McKinley was conveyed from Buffalo to Canton. The second train consisted of two baggage cars, a dining car, two compartment cars, two drawing room cars, an observation car and the private car of Dr. Douglas. With the exception of the few days in the City of Mexico these trains are the home of the party for a whole month, since no adequate facilities, either for rooms or for meals, exist in the smaller Mexican towns. The party started with 25 tons of supplies and provisions, even the drinking water being brought from New York and from Waukesha.

Among those who started with the party at New York or Chicago, or who joined *en route*, were:

C. E. Billin of C. E. Billin & Co., Chicago.
Francis Collingwood of New York.
Edgar S. Cook, president Warwick Iron Company, Pottstown, Pa.
Samuel W. Croxton of the Penn Iron & Coal Company, Canal Dover, Ohio.
S. F. Emmons, United States Geological Survey, Washington, D. C.
W. E. C. Eustis, Boston, Mass.
Cleveland Dodge of Phelps, Dodge & Co., New York.
Dr. James Douglas of Phelps, Dodge & Co., New York.
Thomas M. Eynon, Hughes & Patterson, Philadelphia, Pa.
James Eynon of the Eynon-Evans Company, Philadelphia, Pa.
B. F. Fackenthal, Jr., president Thomas Iron Company, Hokendauqua, Pa.
F. J. Frank, *Mines and Minerals*, Chicago.
W. J. Johnston, publisher *Mining and Metallurgy*, New York.
William Kent, consulting engineer, New York.
C. Kirchhoff, editor *The Iron Age*, New York.
W. R. McIlvain, Reading, Pa.
E. E. Olcott, consulting engineer, New York.
E. W. Parker, editor *Engineering and Mining Journal*, New York.
W. Pilling of Pilling & Crane, iron merchants, Philadelphia, Pa.
Prof. R. H. Richards, Massachusetts Institute of Technology, Boston.
Heinrich Ries, professor of economic geology, Cornell University, Ithaca, N. Y.
H. J. Seaman, Catasauqua, Pa.
George Singer of Singer, Nimick & Co., Pittsburgh.
J. William Smith of the Solvay Process Company, Syracuse.
John E. Sweet of Syracuse, N. Y.
Edwin Thomas, Catasauqua, Pa.
Samuel Thomas, formerly president of the Pioneer Mfg. Company of Birmingham, Ala.
M. D. Valentine, manufacturer of fire brick, Woodbridge, N. J.
W. H. Wiley of John Wiley & Sons, New York.
David Williams, publisher *The Iron Age*, New York.
Jones Wister of L. & R. Wister & Co., iron merchants, Philadelphia, Pa.
A. W. Sheafer, Pottsville, Pa.
Walter Wood of R. D. Wood & Co., Philadelphia.
G. Viele of the General Electric Company, New York.
H. H. Yard, Liberty Furnace Company of Virginia, Philadelphia.
L. Williams of the Napoleon Copper Mines, Milton, Cal.
A. H. Wethey of Butte, Mont.

The party, which started from New York at noon on the 1st inst., reached El Paso on the morning of the 5th, about five hours late, and, crossing the border, had at Juarez the somewhat unusual experience of courteous treatment at the hands of customs house officials. Soon the train, now on the lines of the Mexican Central Railway, plunges into an apparently barren waste of sand hills, with the wonderfully clear cut outlines of mountain chains on every side. Later on the mesquite and sage, in thicker growth, indicate a somewhat better soil, but one cannot escape the feeling that it is only through the liberal and consistent subsidy policy of the Mexican Government that the development of the Mexican railroad system has been at all possible. To the traditionally unsafe "Observer from the Car Window" it looks as though a country like that part of the State of Chihuahua through which the road passes would never furnish a very large tonnage. It is a cattle country, largely belonging to one man, ex-Governor Terrazas, who, it is claimed, is the largest individual owner of cattle, since he brands about 100,000 calves a year.

To those who are accustomed to the wastefulness with water which characterizes the greater part of our own country, there is much that smacks of reproach in observing the care with which the precious fluid is hoarded on the plateau of Mexico.

Chihuahua.

The delay in reaching the city of Chihuahua was very disconcerting to those who had made preparations for the reception of the mining engineers. Hardly had the train drawn into the station, crowded with an applauding populace, when carriages whisked the visitors to the palace, where Governor Miguel Ahumada received the party, a large and admirable band, consisting of pupils of the School of Arts, none of whom is over 16 years of age, furnishing music. Governor Ahumada, who is now serving his third term, is a man of magnificent physique and general manners, who completely captivated his guests. He welcomed the engineers in a graceful little speech, to which E. E. Olcott, president of the institute, responded by an address in Spanish. In the evening the visitors were afforded an unusual opportunity to observe the social side of Mexican life, the occasion being a very largely attended ball given in the Teatro de Los Heroes, a very handsome structure built by the State. A supper was served on the stage, many of the courses giving the engineers their first taste of characteristic Mexican dainties. The next morning was given over to strolls and drives through the city of Chihuahua and to visits to its industries and adjacent mines. In the afternoon a *corrida de toros*, usually erroneously translated as a "bull fight," was held in honor of the engineers.

During the evening the band of the School of Arts gave a concert on the main plaza, which had been elaborately decorated with flags and bunting, the whole *façade* of the old and quaint cathedral being brilliantly illuminated with flickering lights. The band occupied the central pavilion of the plaza, laid out as a garden, while a large share of the audience promenaded about it in two circles, in opposite directions, one of them composed exclusively of men, while in the outer there were ladies with their escorts and alone, thus affording an admirable opportunity to admire and be admired. There was also illuminated the smaller and handsomer plaza in front of the Governor's palace, the center of which is occupied by the statue of Hidalgo, the Washington of

Mexico, who is said to have been killed on the spot where the column now rises.

At midnight the engineers bade farewell to the city and its lavish hospitality.

Chihuahua is a city of 35,000 souls and is one of the most progressive of Mexican towns, being the receiving and distributing center for an enormous territory and ranking high as an industrial community. It contains a large American colony, and has very close and extensive business connections with the United States. It has an admirable modern water purifying plant, connected with an extensive system of water supply, and an up to date sewerage system. The principal macadamized streets are wide and have quite a modern air. The industries are varied and important, and include a large textile mill, La Paz; a fine brewery, a very extensive packing and canning factory, with a capacity of handling 300 head of cattle per day, and a large iron plant. The latter, which is operated under the title of

La Compania Industrial Mexicana,

is under the management of Juan A. Greel, an exceedingly progressive and alert Mexican, a native of Chihuahua, who, with his brother, Enrique C. Creel, is identified with the different industries and with extensive mining enterprises. Mr. Creel, who was partly educated in the United States, began his career in a local bank, and has now, at the age of 35, reached the point where he can work out his patriotic desire of devoting his abundant energies to the uplifting, from an economic point of view, of his countrymen and to the development of the extensive, though still largely dormant, resources of the State. Mr. Creel took hold of the Compania Industrial Mexicana in 1893, when the plant consisted of a small foundry and machine shop. Under his management it has prospered and grown, and is still expanding rapidly. A most interesting feature of much significance which has taken place simultaneously with this development is the education of native labor to the rank of skilled artisans. In 1893 the Mexicans were employed only as common labor. To-day, when running full, the plant has 550 men on its payrolls, of whom all but about 50 are natives. They have taken their places as molders, pattern makers, machinists, rollers and melters, callings unknown to them until now. They are paid the same wages as those earned by the American mechanics, the machinists receiving from $3 to $5 per day, Mexican money, while the pattern makers earn as high as $6, Mexican, per day, wages which in gold are about on a par with those paid in the United States.

The plant consists of a 15-ton Wellman tilting basic open hearth furnace, equipped with a Wellman charging machine, the steel being cast into groups of small ingots on cars, bottom casting having been adopted. The two bottom runners are of such dimensions that after the sprues are cut off a 4-inch billet is produced, which can be rolled into shapes for which an absolutely perfect surface is not necessary. The pig iron is purchased in the United States, but the works use largely old car wheels, and, of course, depend upon the country for the wrought scrap. Purchased muck bars are the raw material for what iron bars are rolled.

The rolling mill, which is equipped with a modern heating furnace, has a 12-inch and an 8-inch train, and produces bars down to ⅛-inch rounds. It is driven by two engines, both of which were built in the works.

There is a large foundry and a good sized machine shop, crowded with American tools, although a number of the tools were made in the shop. The company make a specialty of mining machinery, stamp mills, slag and metal pots, &c., and build Corliss engines up to 1000 horse-power. In the shops in course of erection at the time of the visit of the engineers was a 1000 horse-power horizontal Corliss compound engine for an electric plant. The foundry makes also miscellaneous castings, and quite recently the manufacture of stoves has been taken up. There is a brass foundry and a special department for the manufacture of valves, this being the only plant of its kind in Mexico. All the parts of the plant outside of the rolling mill are driven by electric motors, the engine being a product of the shops. There is now in course of erection a new electric plant, housed in a building the structural work of which was furnished by the American Bridge Company. It is large enough for an equipment of 10,000 horse-power. The present electric installation is supplying the town with light, but has reached its limit of capacity in that direction. The fuel used for the boilers is wood and coal, the latter costing $12 per ton for Mexican and $18 for American coal. The plans are being drawn for a very large new machine shop, the old one having outgrown its quarters.

Friends of Mr. Creel relate a recent experience which illustrates both his enterprise and the difference between foreign and native management. At a short distance from Chihuahua is a copper mining property which has passed through the hands of several English companies, the last having spent about $1,000,000. As an indication of the character of the work done, the fact may be cited that the slags made by the smelter ran 2 per cent. of copper. The property, being regarded as a complete failure, was hawked about in vain. Mr. Creel finally purchased mines and smelter for $25,000, Mexican money. He put in new machinery at the smelter and made improvements which cost in all $92,000, Mexican currency. In 14 months the entire outlay had been recovered and the company, known as the Rio Tinto Mexicana, are earning handsomely.

A run during the night, involving considerable delay, brought the party to

Hidalgo Del Parral,

one of the old mining camps of Mexico. In the last few years the Mexican Central Railroad has built a branch to Parral from the main line at Jimenez. Since the advent of the road this old camp and the even older mining district of Santa Barbara have enjoyed an exceedingly rapid development. In spite of the fact that mining began at Parral probably previous to 1632 and at Santa Barbara as early as the middle of the sixteenth century, no great depth was reached, either on the great Veta Colorado or on the numerous smaller veins of the districts. Parral produced large quantities of silver from the upper workings, while gold was the metal which the veins of the Santa Barbara produced. That the day of bonanzas of rich silver ore has not passed is shown by the fact that Pedro Alvarado, a poor peon, has recently opened at moderate depth on the Palmilla mine an exceedingly rich body of ore. The Parral camp proper produces chiefly silver ore, while Santa Barbara yields in depth argentiferous galena. Three American interests have taken a very active part in the development. The Montezuma Lead Company have purchased a number of mines in the district, have erected a very large concentrating mill of 375 tons daily capacity, and have built a narrow gauge road, equipped with Shay locomotives, to the mines.

The Guggenheim Exploration Company, a New York corporation, own the Tecolotes property, with a concentrating mill, to which, however, a very large new plant is to be added. Very extensive developments are also taking place in the Nuevas Minas division of the Parral district proper. A good deal of French and English capital has been placed recently in the district, some of the mines having been very productive.

Formerly the shipping ore was transported by wagon to Jimenez and naturally only rich ores could stand the cost. Now the cheapening of fuel and of supplies makes it possible to handle the large bodies of low grade ores which abound in the camp, so that local concentration is profitable and at the same time a wider range of the higher grade ores can be sent out of the camp by rail. These ores are marketed at the different smelters controlled by the American Smelting & Refining Company in Mexico and at El Paso, Texas, and at such outside works as those at Mapimi. The miners, however, complain somewhat that the smelting charges are high and that they are not getting the full advantage of the lowered transportation.

Within the past year the Mexican Central has extended its line to the Rio Florido, a distance of 44 miles, thus opening additional mineral territory.

The Parral & Durango narrow gauge road, originally

built to reach the Minas Nuevas district, has extended its line a distance of about 40 miles into a large virgin timber belt.

The district, therefore, is the scene of intense activity and extended a royal welcome to the engineers. After an address by the Mayor two parties were formed, one to go to the Minas Nuevas and the other, under the guidance of Edward Dufourc, an American mining engineer and general manager of the Montezuma Lead Company, to the Santa Barbara district. Unfortunately no opportunity was offered to visit that ancient town which was once the capital of the Province of Nueva Vizcaya, comprising the States of Chihuahua, Texas, New Mexico, Arizona, California and parts of Sonora and Coahuila. The town was founded in 1547, or many years before 1620, when the Pilgrims first set foot on New England soil.

One conspicuous feature of all the Mexican mining towns are the large and quaint churches and cathedrals, monuments of the power of the Church and the generosity of lucky miners, who were lavish in their contributions to the building and to the embellishment of the houses of worship. It is said of one of the large American capitalists who is engaged in mining in Mexico that he regards the existence of a fine church in a locality as *prima facie* evidence of a promising field of mining operations.

The different parties returned to Parral somewhat late in the afternoon, to partake of a banquet served in a large warehouse close to the station, which had been emptied of its contents for the occasion, had been repainted and decorated, the floor being covered with a crash. An elaborate course dinner was served, to supply which far distant localities had been drawn upon. The oysters came from Corpus Christi, the fish from the Gulf at Tampico and the strawberries from Irapuato. Subsequently the party visited the town of Parral and were guests at the Casino, where a dance was in progress.

During the afternoon of the same day a few hours were spent in the quaint old town of Zacatecas, some of the party visiting La Bolsa mine in the vicinity, a prosperous property owned by an English company. Others went to Guadalupe, a small adjoining town, whose church is claimed to be the oldest on the continent. On the whole, Zacatecas itself does not make the impression of being the center of any markedly active section.

C. K.

Screens for Gold Bearing Sand.

When the Government discontinued its purchases of silver many of the poorer silver mines of the United States were closed, thereby throwing out of employment many silver miners and those dependent upon this industry. Quite naturally the gold fields attracted the attention of these idle miners, and many of them, without capital, took up claims in various districts. Cripple Creek, Kootenay, Rossland and other regions were prospected and developed marvelous wealth. The placer mines in various parts of the country offered golden rewards. Alaska came to the front with rivers of gold, and the attention of the whole country has been directed toward the yellow metal.

This has tended to stimulate the inventors and manufacturers of gold mining and gold saving machinery, and many improvements have been made in this line. Placer mining particularly has been studied, and many devices tried for the taking of sand and gravel with their deposits of free gold from the bottoms of rivers and by means of scoops, elevators or suction pumps, raising them to the surface where they can be separated, the gold retained and the gravel dropped back to the river bottoms. It has been found desirable to place the necessary machinery upon flat boats, to be moved about at will, and specially designed machinery has been required to meet the conditions. The separation of the fine gold bearing sand from the gravel and stones is usually accomplished by means of screens made from perforated steel or iron, and perforated cylinders seem to offer the greatest capacity and are most easily kept from clogging.

SCREENS FOR GOLD BEARING SAND.

The accompanying illustration is reproduced from a photograph of two cylinders made by the Harrington & King Perforating Company of Chicago for a dredge screen. They are 6 and 7 feet in diameter respectively, by 10½ feet long. The smaller cylinder contains the largest perforations and is intended to be placed within the larger cylinder, both revolving upon a shaft set horizontally, or nearly so. The sand and gravel are automatically fed through the inner cylinder. All material that is larger than the perforations of this screen is of no value and is returned to the river bottom. The finer material containing the gold passes through the perforations and falls upon the outside cylinder screen, having the smaller perforations, thus making a second separation or grading.

The gold is found with the finest sand, and the object of the double screening is to get rid of all the stones and gravel as quickly as possible and without the loss of any of the sand containing the gold. Finally the gold is separated from the sand, and this is easily accomplished by several well-known methods, all taking advantage of either the difference in gravity between gold and sand, or the affinity which mercury has for the gold.

Blast Furnace Gas Engines in Austria.

The powerful stimulus which the iron industries of all countries have received to adopt the utilization of blast furnace gases for working machinery has found expression in Austria, says the London *Iron and Coal Trades Review*. The honor of erecting the first engine driven by furnace gas there belongs to the Bohemian Mining Company of Vienna, which has just introduced one of 300 horse-power at its works at Königshof, Bohemia. This gas engine was made by the Maschinenbau-Actiengesellschaft of Prague, Karolinenthal, who, in conjunction with the Société John Cockerill of Seraing, have taken up the manufacture of gas motors of the Delamare-Debouttéville type.

The gas engine in question is also remarkable as being the first tandem motor driven by furnace gas. It has two gas cylinders, located one behind the other, 700 mm. (27.58 inches) in diameter, with a stroke of 800 mm. (31.52 inches). The engine makes 150 revolutions per minute corresponding to a piston speed of 4 m. (13.12 feet) per second. The front piston serves as a cross head for the connecting rod, and is connected by a rod with the hinder piston. The necessary stuffing box in the anterior cylinder, owing to its peculiar construction, does not create any difficulties. The motor, notwithstanding the high number of revolutions and the rapid speed of its piston, works with remarkable smoothness, and in no way injuriously affects the foundation. The fears which many engineers have entertained as regards this point are, therefore, proved to be illusory.

The tandem motor, compared with the system in which there are two cylinders opposite each other and a double connecting rod, possesses the advantage of greater simplicity and greater regularity in working. The latter is owing to the fact that the two motive impulses to any two revolutions are uniformly distributed over the whole, whereas with cylinders opposite each other the two motive impulses take place immediately after each other, and are followed by two dead strokes of the pistons. In consequence of this quality of greater regularity a lighter fly wheel can be used for the tandem gas engine.

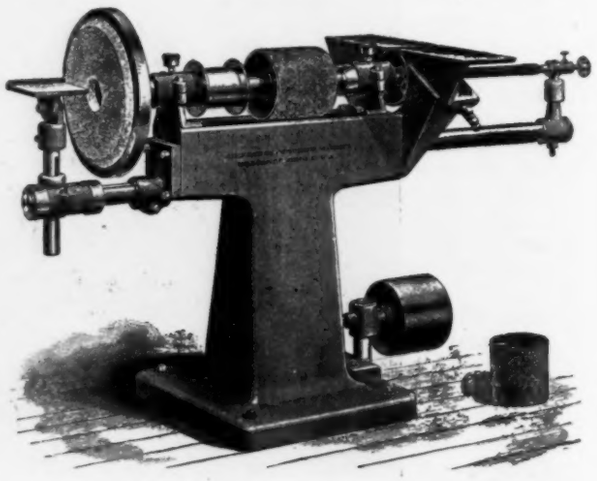
The jackets, valve boxes and the valves themselves are cooled, and, in addition, both the pistons are kept cool with water, which, by means of a movable pipe connection, is introduced at a pressure corresponding to the speed of the piston. The motor is regulated by means of an air cataract, which, in its action, is very sensitive, and enables the number of revolutions to be easily reduced to any limit desired. According to the diagram of the engine, with a constant load the motor works with great smoothness. The amplitude of the curve only amounts to 1.5 mm., corresponding to a cyclical degree of irregularity of 1 in 150.

The fly wheel is 4.250 mm. (14 feet) in diameter, and weighs 22 tons. The gas engine is coupled direct to a 300 horse-power constant current dynamo, delivering a current of 120 volts, which is used for lighting and the transmission of power. The blast furnace gas has a heating value, measured by Junker's calorimeter, of an average of 800 calories per cubic meter. The analysis of the gas gives the following composition: CO_2, 13 per cent.; CO, 25.1 per cent.; H, 1.9 per cent., and N, 60 per cent. The gas taken from the main contains about 2g. of dust to the cubic meter; it is, therefore, passed through an appropriate cooling and purifying apparatus, after which the percentage of dust is reduced to 0.6g. per cubic meter, which amount, during a two months' trial of the working of the engine, had not caused any deposit in the cylinders sufficient to necessitate their cleaning. Ignition is effected by means of an electric spark from a Rhumkorff apparatus. The motor is started in a very simple manner; by means of a suitable device a charge of benzine is sucked in and compressed, and by the next manœuver contact is made for the electrical ignition.

The Königshof Iron Works in the spring of this year erected a blowing engine driven by the gases from the blast furnace, which also was supplied by the company mentioned. This blowing engine is, as regards its gas motor part, similar to that exhibited at the Paris Exhibition by the Cockerill Société. The air cylinder, on the other hand, is furnished with Stumpf's pressure and Corliss suction valves. This type of blowing engine is simple in construction, and suffices for a blast of from 500 to 600 c. m. If a more powerful one is required two such engines may be coupled together. Among the other Austrian iron works that of Kladno has placed an order with the same firm for a 600 horse-power twin tandem motor. This gas engine will consist of two tandem machines of the type described, and the cranks at an angle of 180 degrees will drive an alternating dynamo mounted upon the common crank shaft. This engine will, therefore, have four cylinders, so that for every piston stroke there will be an ignition, and, consequently, the motor will work with regularity and smoothness.

The Defiance Grinding and Polishing Machine.

The machine here illustrated is equipped with a solid emery disk, set in a metal ring, which is used for grinding and truing up work. It is also fitted with two polishing drums, and a small round emery rod for polishing small curves. An emery belt can be used over the pulley at the base of the machine and the one underneath the table. The emery disk is 16 inches in diameter, and is provided with a swinging adjustable table which is planed true on top. It can be used to carry the work across the face of the disk, or as a stationary table. The polishing drums are 6 x 6 and 7 x 7 inches. The table over the smaller drum is provided with a vertical adjustment to regulate the depth of cut. The machine is built by the Defiance Machine Works, Defiance, Ohio.



THE DEFIANCE GRINDING AND POLISHING MACHINE.

Fire caused quite a little trouble to the power service of the Niagara Falls Hydraulic Power & Mfg. Company last Sunday afternoon. The trouble originated from a short circuit in the wire tower, through which numerous cables passed from the power house in the gorge to the factory district on top of the bank. This tower was of wood, about 10 feet in diameter. It served as a great chimney, and the flames flew up it with great rapidity. The aluminum cables which it contained were melted, and the current service cut off. The plants affected by the fire were the lower works of the Pittsburgh Reduction Company, the Acker Process Company,

the Gorge electric line, and the incandescent lighting system of the Buffalo and Niagara Falls Electric Light & Power Company. This latter company threw in a reserve plant and were enabled to give a partial service on their incandescent system Sunday evening, and by Monday morning new cables had been run over the cliff to the power house below. It will take all of two weeks to repair the cable damage.

The Jackson Belt Lacing Machine.

The belt lacing machine built by the Diamond Drill & Machine Company of Birdsboro, Pa., consists essentially of three spirally grooved rolls, made of tool steel, which are operated either by a crank or by belt. A spiral needle is inserted at one end of the machine between the rolls, and is carried through and made to pierced the belt by the revolution of the rolls. The lacing wire, also spirally coiled, follows the needle, going through the punctures made by it in the belt, as shown in Fig. 3. The belt is then removed from the machine and the wire flattened by pressing it between the upper and lower jaws, which are operated by levers. By this means the wire is forced well into the belt so that it is flush with the surface. The two ends are then coupled together with twine, lacing, raw hide pins or metallic pins. A cutter bar is provided, which cuts the end of the belt at right angles with the sides. These machines are made in four sizes—6, 12, 18 and 24 inches. The first two are operated by hand and the others by belt power.

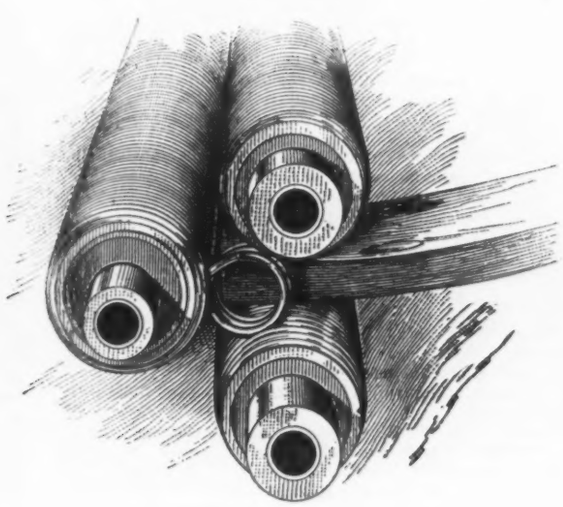


Fig. 2.—Belt Finished.

Fig. 3.—Sketch Showing Operation of Machine.

THE JACKSON BELT LACING MACHINE.

British Westinghouse Electric Company.

The British Westinghouse Electric & Mfg. Company, Limited, now erecting large new works at Manchester, England, realized as net earnings the second fiscal year about $250,000. The plant is nearing completion and is expected to be ready to receive tools and machinery by the first of next year. In the last fiscal year, ending with July, the British Company secured business amounting to more than $3,000,000. These contracts were filled by the Westinghouse Electric & Mfg. Company, at Pittsburgh, but this arrangement will end when the Manchester works are ready for operation. The British company were formed in July, 1899, and authorized to issue £1,000,000 in preference shares. The company acquire the rights in all patents and business in Great Britain and its colonies from the Westinghouse Electric & Machine companies and Westinghouse, Church, Kerr & Co. of New York. The Manchester works will produce the various lines in electrical manufacture, machines and engines manufactured by the Westinghouse plants at Pittsburgh. Last week the Pittsburgh offices of the Westinghouse companies received by cablegram the second annual report of the British company. The most important portion of this follows:

Pending the completion of the company's works at Manchester orders have been executed at Pittsburgh on terms whereby the British company share with the American company in manufacturing profit. The British company's net profits for the year (including £10,000 not ascertained in time to be brought into last year's account) amount to £49,533 4s. and 6d. Out of this sum an interim dividend of £15,000 has been paid, and the directors propose to appropriate a further sum of £15,625, making the full 6 per cent. dividend upon the £750,000 preference shares, as paid up on July 31. This will leave £18,980 4s. 6d. to be carried forward.

The British company, therefore, have no occasion to call upon the American company for their guarantee (that pending the erection of the works at Manchester the profit shall be sufficient to pay dividends upon the 6 per cent. preference shares). This guarantee extends to two more half yearly dividends, payable May and November, 1902.

Orders for electrical machinery at the formation of the company in 1899 amounted to £279,000. Orders received during the year ending July 31, 1900, £547,000. Orders received during the year ending July 31, 1901, £738,000. By reason of recent improvements it is expected that gas engines of greater horse-power will come into use for the operation of electrical generators. During the past year 12 important gas engine installations, aggregating 3000 horse-power, have been sold, and negotiations are pending for over 10,000 horse-power of larger units.

We have received from the International Acheson Graphite Company, Niagara Falls, N. Y., a pencil of excellent quality made from Acheson graphite manufactured in the electric furnace.

The National Founders' Association.

FIFTH MEETING.

In the programme prepared for discussion at the fifth meeting of the National Founders' Association, which was held in New York last Wednesday and Thursday, there was so much of interest that less than one-third of it was considered. There were 20 topics scheduled for the consideration of the members. Of such absorbing interest were they, and so enthusiastic were those present, that but six of these topics were brought before the convention.

While the attendance was not as large as at previous conventions of the association, the members showed a marked alertness in participating in the discussion of the various subjects. This made the New York meeting one of the most interesting and successful ever held. Among those present were:

H. W. Hoyt, Allis-Chalmers Company, Chicago.
Antonio C. Pessano, Geo. V. Cresson Company, Philadelphia.
John R. Russel, Russel Wheel & Foundry Company, Detroit.
H. N. Covell, Lidgerwood Mfg. Company, Brooklyn.
G. E. Emmons, Edison General Electric Company, Schenectady.
I. W. Frank, Frank-Kneeland Machine Company, Pittsburgh.
Nathaniel French, Bettendorf Metal Wheel Company, Davenport, Ia.
Jos. A. Stone, Riverside Foundry Company, Cleveland.
Geo. Q. Thornton, Carondelet Foundry Company, St. Louis.
F. T. Towne, Yale & Towne Mfg. Company, Stamford.
W. H. Pfahler, Abrom Cox Stove Company, Philadelphia.
Willis Brown, Walker Foundry Company, Erie, Pa.
John A. Rathbone, United States Heater Company, Detroit.
Geo. H. Lincoln, Geo. H. Lincoln & Co., Boston.
E. H. Walker, J. I. Case Threshing Machine Company, Racine.
P. W. Gates, Allis-Chalmers Company, Chicago.
W. D. Sargent, the Sargent Company, Chicago.
Ellis L. Rowe, Rensselaer Mfg. Company, Troy.
Jas. McKown, Josiah Anstice & Co., Rochester.
G. T. Bliss, Erie City Iron Works, Erie.
Walter Perry, Farrel Foundry & Machine Company, Ansonia.
W. A. Jones, W. A. Jones Foundry & Machine Company, Chicago.
R. J. Cleveland, Cleveland & Barr, Chicago.
John Ramsay, John Ramsay & Co., Chicago.
Lincoln Haney, Globe Foundry, Cincinnati.
C. A. G. Winther, Chapman Valve Mfg. Company, Indian Orchard, Mass.
H. K. McLean, Link-Belt Machinery Company, Chicago.
James E. Hunter, James Hunter Machine Company, Boston.
Edwin Maher, Maher & Flockhart, Newark.
Allen Ames, Ames Iron Works, Oswego.
W. S. McMullan, Richmond Stove Company, Norwich.
O. P. Letchworth, Pratt & Letchworth Company, Buffalo.
L. D. Collins, Johnston Harvester Company, Batavia.
Edgar McDougall, Jno. McDougall, Montreal, Que.
John M. Taylor, Dominion Radiator Company, Toronto, Ont.
R. L. Ireland, American Ship Building Company, Cleveland.
Alex. Adams, St. Paul Foundry Company, St. Paul.
Stuart R. Carr, Stuart R. Carr Company, Baltimore.
Jas. E. Orme, Henry Orme, St. Paul.
W. S. Douglas, the Wm. Tod Company, Youngstown.
Philip Medart, Medart Patent Pulley Company, St. Louis.
D. J. Matlack, Wm. Cramp & Sons Ship & Engine Building Company, Philadelphia.
Elmer H. Dearth, Diamond Iron Works, Minneapolis.
Oliver Crosby, American Hoist & Derrick Company, St. Paul.
A. Winger, Superior Drill Company, Springfield, Ohio.
H. R. Micks, Rumsey & Co., Limited, Seneca Falls.
Alex. Jarecki, Jarecki Mfg. Company, Erie, Pa.
P. Kennedy, P. Kennedy Foundry, Baltimore.
F. B. Farnsworth, McLagon Foundry Company, New Haven.
E. E. Durant, the George F. Warner Mfg. Company, New Haven.
C. W. Davenport, National Foundry, Erie, Pa.
F. A. Ingalls, Buda Foundry & Mfg. Company, Harvey, Ill.
M. F. Moore, Marine Engine Machine Company, Harrison, N. J.
Walter H. Laurie, Laurie Engine Company, Montreal.
R. C. Schenck, Dayton Malleable Iron Company, Dayton, Ohio.
Robt. H. Foos, Foos Mfg. Company, Springfield, Ohio.
J. S. Stirling, Harlan & Hollingsworth Company, Wilmington.
Geo. A. Swartwout, Peru Steel Castings Company, Peru, Ind.
W. W. Cheney, S. Cheney & Son, Manlius, N. Y.
Wm. P. Allen, Wm. Allen & Son, Worcester, Mass.
Asa S. Bushnell, Warder, Bushnell & Glessner Company, Springfield, Ohio.
Chas. L. Bauer, Warder, Bushnell & Glessner Company, Springfield, Ohio.
Wm. B. Smith, Smith & Caffrey, Syracuse.
Geo. L. Hopping, Tarrant Foundry Company, Chicago.
Albert Hoppin, Allis-Chalmers Company, Buffalo.
Wm. R. Brown, Brown-Ketcham Iron Works, Indianapolis.
Geo. T. Brown, Brown Cotton Gin Company, New London, Conn.
H. M. Wallis, J. I. Case Plow Works, Racine, Wis.
R. C. Oliphant, Trenton Malleable Iron Company, Trenton.
Wm. M. Taylor, Chandler & Taylor Company, Indianapolis.
Matthew Griswold, Griswold Mfg. Company, Erie, Pa.
Matthew Griswold, Jr., Griswold Mfg. Company, Erie, Pa.
Alex. I. Lewis, Michigan Brass & Iron Works, Detroit.
R. D. Reed, H. B. Smith Company, Westfield, Mass.
E. M. Walker, Chas. Parker Company, Meriden, Conn.
Samuel A. Kensie, Tioga Foundry Company, Philadelphia.
Jacob B. Blankley, Tioga Foundry Company, Philadelphia.
Wm. Butterworth, Deere & Co., Moline, Ill.
H. F. Wanning, Birmingham Iron Foundry, Derby, Conn.
W. L. Herendeen, Herendeen Mfg. Company, Geneva, N. Y.
C. D. Palmiter, Watertown Engine Company, Watertown.
J. Sellers Bancroft, Wm. Sellers & Co., Philadelphia.
F. A. Strong, Eaton, Cole & Burnham Company, Bridgeport, Conn.
H. M. Leland, Leland & Faulconer Mfg. Company, Detroit.
Jno. McLaren, Phillips & McLaren, Pittsburgh.
Geo. T. Marsh, South Baltimore Foundry, Baltimore.
W. R. McClave, McClave, Brooks & Co., Scranton, Pa.
Geo. S. Rominger, Girard Iron Works, Philadelphia.
Arthur E. Barlow, Arthur E. Barlow, Newark.
F. V. Bartlett, Pratt & Whitney Company, Hartford.
J. H. Whiting, Whiting Foundry Equipment Company, Harvey, Ill.
Wm. J. Carlins, Thos. Carlins Sons Company, Allegheny, Pa.
Geo. H. Gibby, Condor Iron Foundry Company, Boston.
Otis H. Cutler, Ramapo Foundry Company, Mahwah, N. J.
S. J. Meeker, S. J. Meeker, Newark.
J. M. Cory, S. J. Meeker, Newark.
Thos. Devlin, Thos. Devlin & Co., Philadelphia.
D. J. Kirby, Kirby Mfg. Company, Cleveland, Ohio.
Carl Horix, Geo. B. Sennett Company, Youngstown.
H. J. Boggis, Taylor & Boggis Foundry Company, Cleveland.
M. E. Kennedy, Kennedy Valve Mfg. Company, Coxsackie, N. Y.
F. H. Fairweather, Kennedy Valve Mfg. Company, Coxsackie, N. Y.
Chas. Patterson, Patterson Foundry Company, Cleveland.
Chas. A. Patterson, Patterson Foundry Company, Cleveland.
J. H. Webster, Variety Iron Works Company, Cleveland.
G. A. Watts, Watts-Campbell Company, Newark.
Jas. R. Sutliff, Foster, Merriam & Co., Meriden, Conn.
Douglas G. Moore, Samuel L. Moore & Sons Company, Elizabeth.
Oliver Phelps, Lorain Foundry Company, Lorain, Ohio.
H. Van Atta, J. L. Mott Iron Works, New York.
Herbert B. Atha, Benj. Atha Company, Newark.
L. H. Wales, Russell & Erwin Mfg. Company, New Britain, Conn.
Stanley G. Flagg, Jr., Stanley G. Flagg & Co., Philadelphia.
H. R. Luther, Barbour-Stockwell Company, Boston.
Fred. F. Stockwell, Barbour-Stockwell Company, Boston.
S. Decatur Smith, S. Decatur Smith, Philadelphia.
Henry E. Pridmore, Henry E. Pridmore, Chicago.
T. L. Greenwald, the I. & E. Greenwald Company, Cincinnati.
Daniel A. Waters, Goodell & Waters, Philadelphia.
J. S. Van Cleve, Erie Foundry Company, Erie, Pa.
Samuel J. Watson, Watson Machine Company, Paterson, N. J.
John E. Harbster, Reading Hardware Company, Reading, Pa.
James Eastwood, Benj. Eastwood Company, Paterson, N. J.
W. F. Prince, International Steam Pump Company, Elizabethport.
Wm. Schwanhauser, H. R. Worthington, Brooklyn.
David W. Mesick, Fulton Foundry & Machine Company, Brooklyn, N. Y.
Samuel G. Allen, Franklin Air Compressor Company, Franklin, Pa.
E. R. Harty, Rumsey & Co., Limited, Seneca Falls, N. Y.
J. G. Aldrich, New England Butt Company, Providence, R. I.
L. F. Bower, Allis-Chalmers Company, Scranton, Pa.
Geo. H. Graham, Oriskany Malleable Iron Company, Oriskany, N. Y.
Jas. Lanigan, Davis Foundry Company, Lawrence, Mass.
E. Y. Moore, Chisholm & Moore Mfg. Company, Cleveland, Ohio.
R. H. North, North Bros. Mfg. Company, Philadelphia.
E. A. Pridmore, H. E. Pridmore, Chicago.
David S. Creswell, David S. Creswell, Philadelphia.
D. Lewis Bartlett, Bartlett, Haywood & Co., Baltimore.
Alfred C. Rex, Ferro Carbon Casting Company, Philadelphia.
Edw. J. Etting, Whiting Foundry Equipment Company, Philadelphia.

A most elaborate and intensely interesting address and report was delivered by President H. W. Hoyt. He reviewed in an able manner all of the important phases of the secret work of the association, and lent his views as to the most expeditious methods of solving problems before the association. His report dealt at length with the events of special significance in the association's affairs dating from the Niagara convention,

held last spring. It outlined an aggressive campaign for the ensuing year.

He reviewed the joint conference held at Cleveland on June 10 and 11, at which committees of the National Founders' Association and the Iron Molders' Union of North America found it impossible to agree upon a standard wage rate. He also rehearsed in a very concise and complete manner the history of the Chicago strike, which has not yet been brought to an end.

The report suggested new methods of procuring a sufficient number of competent men to take the place of striking employees. The employment of good, reliable foremen was deemed advisable.

It was urged that the piece work system and molding machines should be adopted to the fullest possible extent. Among the more important results of the Chicago strike, he said, will be the adoption of these methods, due to the number of shops that will be compelled to employ nonunion men.

The movement to extinguish all the differentials between bench and floor molders, he said, has been urged forward with great persistency this year, and that the Iron Molders' Union were disposed to see the matter settled locally rather than as a national issue.

He said that shortly after the Chicago wage agreement was made the foundrymen in St. Louis, Cincinnati and Detroit, and their molders, agreed upon the Chicago rate without the slightest disturbance.

Referring to the matter of foundry foremen, he said that a strictly first-class foreman can pull a foundry successfully through difficulties that may arise. The good foreman finds time to instruct apprentices. Mr. Hoyt referred at great length to the fact that in the shops that were most successful in Chicago much assistance has been given to the association by the foremen, who in many cases were important factors and thoroughly loyal to their employers.

As to the matter of molding machines, Mr. Hoyt again paid the foreman a compliment. He said that if the foreman understands his business he will frequently allay opposition before he invites it. At the outset an effort was made to taboo the molding machine entirely. Recognizing the utter futility of presenting such a policy, the union resolved to tolerate the machine on conditions which included its control. Now the union want a chance to demonstrate that the journeymen molder can make the molding machine more efficient than the handy man or laborer.

In connection with the New York agreement President Hoyt referred to the fact that while it had failed to bring about the objects desired by both parties, it should be retained until a better one has been devised. He said, "the greater you make this organization the stronger you can make your agreements, the stronger you make your agreements the more certain you will be that there will be no violation of them." As an illustration of the power of the National Founders' Association he cited the fact that during the summer months when the machinists' strike was at its hight a large number of telegrams and letters were received at the headquarters of the Iron Molders' Union in Cincinnati requesting the privilege to go on strike in sympathy with the machinists. All of these were refused by President Fox and his Advisory Board, through the influence of the National Founders' Association and the agreements which are in existence between the two bodies.

As a recommendation of the Machine Trades and Professions Association, Mr. Hoyt said: "At the convention of the National Founders' Association held in New York City November last there was much favorable interest shown in an organization of mechanics which bound itself to take no part in any strike, but to protect itself by securing agreements to arbitrate all differences, the plan being to use the funds that labor unions ordinarily bestow for strike benefits to secure educational advantages for its members. You will be interested to know that the organization, the Machine Trades and Professions Association, has slowly but surely gained in influence and membership in Columbus, Ohio, where it was started three years ago. Its membership has been recruited more largely from the ranks of machinists and pattern makers than from among the molders, which condition may be attributed to the fact that the Iron Molders' Union is very strong in Columbus. It has, however, undoubtedly disseminated a powerful influence for moderation and conservatism among all the trades of that city, while among the machinists it practically controls the situation, rendering a strike in that trade a very remote possibility.

"This association of mechanics has received invitations from Cincinnati, New York and Philadelphia to send men to establish other branches than the one in Columbus. Thus far they have been unable to do so, because of the expense, but the tenor of these inquiries shows that a considerable proportion of employers in those cities are prepared to form such a movement. This union of mechanics is striving to help its members to help themselves. They are endeavoring to build up the 'men behind the guns,' not with the idea of pulling against their employer, but, on the contrary, with him. Such work is worthy of hearty commendation."

Mr. Hoyt concluded his report by speaking of the enthusiastic support of the various district chairmén, the officers and members of the administrative council.

The report of Treasurer John R. Russel showed the association to be in a sound financial condition.

Secretary John A. Penton read an exhaustive report in which he outlined the many successful achievements of the association. He also recalled some of the difficulties met with in certain sections where trouble with the men was confronted and referred briefly to the successful manner in which they had been adjusted.

In discussing the topic, "Are Agreements of Any Character with Core Makers Desirable?" the consensus of opinion was in the negative. The general view taken was that the core shop was the kindergarten of the foundry and that the boys should not be allowed too soon to feel the responsibility which recognized trade unionism invests in its members. Some of the members said that they were employing women and girls to good advantage in the making of cores, while others had found that for obvious reasons this practice was undesirable. H. M. Leland of the Leland & Faulconer Mfg. Company of Detroit led the discussion.

There was a strongly favorable sentiment regarding the question, "Is the Molding Machine for a Complicated Class of Machinery a Profitable Investment?" Regarding the second clause of the question, which read, "and Should It be Operated by Molders or Laborers?" the argument was almost entirely in favor of the laborer.

G. E. Emmons of the General Electric Company of Schenectady opened the debate by stating that after considerable reluctance he adopted the molding machine, not meeting with success until he obtained a trained operator of the machines to supervise their operation. Since then, he said, their adoption has been most successful. Intricate and comparatively large castings are being turned out on the machines now, and, while upward of 60 of them are now in use at the Schenectady shops, the number is constantly being increased. He produced figures showing the adoption of the machines to be a very profitable investment. Mr. Emmons stated that his experience showed that the molders on certain difficult work were obtaining better results than did the laborers first employed.

William Schwanhausser of the Worthington branch of the International Steam Pump Company also spoke highly of the efficiency of the machines, and produced figures showing not only an increase in the number of castings produced, but also a decrease in the percentage of the castings lost. He strongly advocated the employment of laborers to operate the machines. His remarks were strengthened by W. F. Prince of the Elizabethport works of the International Steam Pump Company.

Antonio G. Pessano of the George V. Cresson Company, Philadelphia, also spoke in a similar vein. H. N. Covell of the Lidgerwood Mfg. Company of Brooklyn praised the machines in equal terms, stating that he was contemplating the installation of machines 8 feet square. Regarding the operators, he said that that was a subject to be decided by the shops individually, for "if the

molders produce better work why not let them have the machines?"

In answer to the query, "Why is it that the National Founders' Association Does Not Include Every Desirable Membership in the Country?" resolutions were adopted giving the Administrative Council full power to rearrange, if necessary, the plan of assessment, especially as regards new members. As the assessments have always been levied on a per capita basis, it was decided to devise a method whereby new members would not be obliged to share the burden of expense incurred prior to their admission to membership. F. T. Towne, Yale & Towne Mfg. Company, Stamford, Conn.; Alex. Jarecki, Jarecki Mfg. Company, Erie, Pa., and George Mesta, Mesta Machine Company, Pittsburgh, Pa., opened the subject.

No decision was arrived at in connection with the question, "Are we ready for the universal adoption of shorter hours, and if not, are they desirable and how should change be brought about?"

It was unanimously decided that "handy men" can be profitably employed in a foundry to a very large extent, when the question bearing on that subject was brought up.

The topic, "Injunctions and Their Value," brought forth a very able, forceful and conservative address from Judge Nathaniel French of Davenport, Iowa. J. H. Webster of Cleveland also defined the issue in a clear and capable manner. The gist of the remarks was that precautionary measures should at all times be adopted, and that they should only be applied for when trouble was inevitable. Under such circumstances it was held injunctions were desirable.

In the nomination of officers, Judge French paid high tribute to the work of Treasurer John R. Russel, who had served for two years, and suggested that he remain the choice for re-election. He referred to the achievements of the association during the last five years, and stated that it had led manufacturers to see that there was some justice in the claims of the men. Manufacturers, he said, were operating and treating with their men on a broader plane, out of which will arise better conditions for the men who make the molds and carry the molten metal.

Ex-Governor Bushnell of Ohio, in seconding the nomination of Secretary John R. Penton, praised the very efficient work which he has given the organization since its inception, and he paid a glowing tribute to his magnificent work in behalf of the foundries of America. Judge French then read the plans adopted by the Administrative Council for the enlargement of the duties of the secretary, as follows:

The Administrative Council, acting in accordance with the authority vested in it by recent amendments to the by-laws of the association, and in pursuance of the resolution adopted by the Niagara Falls convention, hereby adopts the following method of conducting the detail executive work of the association, all of which is designed to relieve the president, vice-president and chairmen of the District Committees of the large amount of detail work which they have heretofore been called upon to perform:

1. The secretary of the association shall be constituted a commissioner, and, in addition to the duties of secretary prescribed in the by-laws, shall take charge, under the direction of the president, of the executive work of the association for the purpose of averting and settling difficulties.

2. The commissioner, with the consent of the Administrative Council, may employ such assistants as he may require.

3. The commissioner shall be empowered to transact such business as has heretofore been referred directly to the president or chairmen of the districts, and to that end, all communications from members requiring executive action shall be addressed to him.

4. The commissioner may, in case of necessity, convene through the president the District Committees.

5. The Administrative Council shall hold quarterly meetings, the time and place of such meetings to be fixed at the preceding meeting. At these meetings the commissioner shall make full reports of the official acts of his office.

The following officers were elected for the ensuing year:

President, W. D. Sargent, the Sargent Company, Chicago, Ill.
Vice-President, F. T. Towne, Yale & Towne Mfg. Company, Stamford, Conn.
Treasurer, John R. Russel, Russel Wheel & Foundry Company, Detroit, Mich.
Secretary and Commissioner, John A. Penton, Detroit, Mich.

Following are the district committees elected:

First District.

Chairman, C. L. Newcomb, Deane Steam Pump Company, Holyoke, Mass. Vice-Chairmen, R. D. Reed, the H. B. Smith Company, Westfield, Mass.; Geo. H. Gibby, Condon Iron Foundry Company, Boston, Mass.; F. B. Farnsworth, McLagon Foundry Company, New Haven, Conn.; F. V. Bartlett, Pratt & Whitney Company, Hartford, Conn.

Second District.

Chairman, G. E. Emmons, Edison General Electric Company, Schenectady, N. Y. Vice-Chairmen, W. L. Herendeen, Herendeen Mfg. Company, Geneva, N. Y.; H. W. Wendt, Buffalo Forge Company, Buffalo, N. Y.; Wm. Schwanhausser, Henry R. Worthington, Brooklyn, N. Y.; R. C. Oliphant, Trenton Malleable Iron Company, Trenton, N. J.

Third District.

Chairman, I. W. Frank, Frank-Kneeland Machine Company, Pittsburgh, Pa. Vice-Chairmen, Willis Brown, Walker Foundry Company, Erie, Pa.; Wm. S. Hallowell, Harrison Safety Boiler Works, Philadelphia, Pa.; D. Lewis Bartlett, Bartlett, Hayward & Co., Baltimore, Md.; Jas. Stirling, Harlan & Hollingsworth Company, Wilmington, Del.

Fourth District.

Chairman, Chas. L. Bauer, Warder, Bushnell & Glessner Company, Springfield, Ohio. Vice-Chairmen, J. H. Webster, Variety Iron Works Company, Cleveland, Ohio; H. J. Cosiger, Eureka Foundry Company, Cincinnati, Ohio; Geo. W. Crouse, Aultman, Miller & Co., Akron, Ohio; H. Stoddard, Stoddard Mfg. Company, Dayton, Ohio.

Fifth District.

Chairman, W. J. Chalmers, Allis-Chalmers Company, Chicago, Ill. Vice-Chairmen, Wm. M. Taylor, Chandler & Taylor Company, Indianapolis, Ind.; C. R. Stephens, Moline Plow Company, Moline, Ill.; Lewis Searing, Denver Engineering Works Company, Denver, Col.; F. E. Nulsen, Missouri Malleable Iron Company, East St. Louis, Ill.

Sixth District.

Chairman, O. P. Briggs, Twin City Iron Works, Minneapolis, Minn. Vice-Chairmen, Chas. E. Sammond, Stowell Mfg. & Foundry Company, Milwaukee, Wis.; H. H. Wallis, J. I. Case Plow Company, Racine, Wis.; F. J. Neacy, Filer & Stowell Mfg. Company, Milwaukee, Wis.; Geo. M. Gillette, Minnesota Malleable Iron Company, Minneapolis, Minn.

Seventh District.

Chairman, T. J. Drummond, Montreal Pipe Foundry Company, Montreal, Que. Vice-Chairmen, John H. Tilden, Gurney, Tilden Company, Limited, Hamilton, Ont.; C. H. Carrier, Carrier, Lane & Co., Levis, Que.; C. H. Waterous, Waterous Engine Works Company, Limited, Brantford, Ont.; A. Oakley, Canada Foundry Company, Toronto, Ont.

Presentations to Officers.

A banquet was held in the Gilsey House on Wednesday evening. Judge Nathaniel French acted as toastmaster, and discharged the delicate and responsible duties of that position in a most admirable manner, contributing greatly to the pleasure of the evening. Responses to toasts were made by P. W. Gates of Chicago, the first president of the association; O. P. Letchworth of Buffalo, the second president; J. H. Webster of Cleveland, Antonio C. Pessano of Philadelphia, and John M. Taylor of Toronto, one of the Canadian members.

Opportunity was taken at this banquet to present President Hoyt with a magnificent sterling silver tea set and salver, consisting of seven pieces. This was one of the most elaborate of the sets exhibited at the Pan-American Exposition by the Gorham Mfg. Company, is designed in French Renaissance and is very massive. The salver bears an inscription stating that the set was presented to Mr. Hoyt by the National Founders' Association as a token of its appreciation of his services as president. Accompanying the gift is a handsomely bound volume, in which are preserved the letters from the members of the association sent when making their contributions to the purchase of the gift. These letters are in all cases expressive of the high esteem in which Mr. Hoyt is held both personally and in consideration of the very important services rendered in managing the labor troubles arising during his administration. The presentation speech was made by Mr. Webster, to which Mr. Hoyt made a suitable response.

Another very interesting episode of the convention was the presentation by the Cleveland and Lorain foundrymen of a token of their esteem to Secretary Penton. Mr. Penton distinguished himself in the management of the interests of the foundrymen in the great molders' strike at Cleveland and Lorain last year. The testimonial presented to Mr. Penton consisted of

a chest of sterling silver knives, forks and spoons, also the product of the Gorham Mfg. Company. The chest contained 139 pieces. In connection with this gift a beautifully bound volume of letters was also presented, which accompanied the contributions of the various foundrymen, and were written to Oliver Phelps, general manager of the Lorain Foundry Company, who took the initiative in arranging for this testimonial. These letters were of the most complimentary character, and testify in the strongest manner possible the appreciation in which the services rendered by Mr. Penton have been held. The management of this strike was conducted with much bitterness on the part of the strikers, and not only was great tact required, but the highest personal courage.

The Lilley Clamp Lathe Dog.

The clamp lathe dog made by H. H. Lilley of Milford, Mass., has one screw, which operates the movable jaw. This jaw does not move in guides in the frame, but is held directly to the end of the screw. The hole in the jaw is conterbored to receive a hardened washer for the screw to bear against. This permits of the jaw

THE LILLEY CLAMP LATHE DOG.

being made of soft metal that will not injure finished work. The jaws have four points of contact and will hold round or square stock equally well.

Pacific Coast News.

SAN FRANCISCO, CAL., November 11, 1901.

After all the talk that has been indulged in on the subject, and all the plausible predictions made only to be voided, it does seem as if the machinists' strike was about at an end at last. The men have gone back at several places, and to crown all they have gone back to the Fulton Iron Works, next to the Union and the Risdon one of the largest establishments in the city. Over 100 machinists and other mechanics went to work at 7 a.m. to-day after being idle since May 20. Negotiations to this end have been going on for some time and were concluded directly with the men without the intervention of the union. The officials of the latter, however, were thoroughly cognizant of what was going on, and it is understood that they offered no strenuous objection.

The terms have not been given out, but it is understood that they are nine hours work and nine hours wages, or $3.15 a day. They have thus gained nothing by the strike except experience, and that of the most bitter kind. It is but fair to say, however, that the majority of the men were at heart opposed to the strike from the first, and only went into it under instructions from the national body. All have gone back—machinists, boiler makers, pattern makers, blacksmiths, &c.—so now work on army transports and merchant steamers can be done in the city again without any friction between employers and employed.

It had been predicted that the strike would be brought to a close soon after the election, and it now looks as if this would be the case. The election resulted in the return of Schmitz, the labor candidate, as Mayor, after one of the most exciting struggles in the history of the city. Mr. Schmitz himself is an employer of labor, and during the strike his establishment granted all the machinists' demands. It was proved, however, that during the strike it did work for the Risdon Works, and he was opposed by a section of the labor element, but he was elected all the same. It happens that the winter schedule of work, nine hours, begins to-day, so that both employers and employed are able to save their dignity. And when the summer schedule begins again those who have now gone to work and those who are going to work will think twice before they walk out again.

This strike has cost the men—7000 of all trades employed in the iron industry of this city—$3,000,000 in wages, and during the time that it has lasted has paralyzed the local iron and metal industries. Of course, during its continuance the larger shops have had a larger or smaller working force employed all the time, but it is safe to say that during the past five months not over one-third of the work has been done that should have been during that time. The value of our iron industries for the year will therefore show a big falling off, even were the strike to stop now. The workmen endeavored to accomplish the impossible, for we have very active agents of Eastern manufacturers in the city, and with Eastern competition and a ten-hour day, it was impossible to have a nine-hour day here. Of course there are exceptions, where simply repair work is carried on, and where the owners of vessels, &c., have to stand the expense, whatever it may be, but this, too, results in repairs, where the matter can at all be delayed, being done at foreign ports. And there are some descriptions of local work that must necessarily be done here, but even in these cases, one and all, with few exceptions, stood out with their brethren. It has been evident long since to all that the strike was lost, but a show of keeping up the hopeless struggle had to be made.

As to business in general, and to that in hardware and metals in particular, it could hardly be better. Every one in the line has all that he can do at present. There is a good export demand for machinery and large shipments, when local conditions are considered. A good deal of Eastern machinery has been shipped in transit and some foreign. With the cessation of the strike this business will come back to us again.

The general condition of the State is all that can be wished for. The Clearing House exchanges continue to show a great increase of business over 1900, and in some cases where cars are wanted for Eastern shipment they cannot be had. J. O. L.

Industrial Crisis in Austria.—United States Deputy Consul-General Simon W. Hanauer, at Frankford-on-Main, reports that accounts from Prague, Bohemia, state that industrial conditions in Austria are going from bad to worse. The Bohemian rolling mills have been forced to discharge a large number of hands. The Prague Iron Industrial Company, as also the Bohemian Mining Company, two of the most extensive works in Austria, have also reduced operations, discharging a large force of workmen. Several hundred operatives were discharged at the iron works in Kladno and Teplitz, Bohemia. The sales of the combined works belonging to the Austrian syndicate during 1900 were 62,000 metric tons less than in 1899, and it is estimated that they will shrink much more this year. Their sales comprised 505,000 metric tons in 1899. Germany was a large customer for this Bohemian iron. The depression in that country curtails the sales, and the demand from domestic (Austrian) machine and bridge building works has almost ceased.

The Zeman Iron Works, at 1590 Broadway, Cleveland, Ohio, established in 1895 by M. Zeman, were incorporated on October 12. The name of the new company is the Zeman Iron Works Company. Mr. Zeman was elected president and will attend to the mechanical department. J. H. Nieding, formerly of the oil firm of Schofield, Shurmer & Teagle, is secretary and treasurer. The new company have added considerable machinery to the former equipment of the works and expect to secure a larger part of the benefits resulting from Cleveland's building boom. They are manufacturers of wrought iron fences and of builders' iron and wire work generally.

Naval Architects and Marine Engineers.

NINTH MEETING.

The ninth general meeting of the Society of Naval Architects and Marine Engineers was held in New York last Thursday and Friday. The convention was well attended by those who have to do with the design, construction and handling of the modern "peace makers." The papers presented were of the greatest interest and were diversified in that they dealt with almost all the branches of marine engineering, the equipment of war vessels, and the sailing of ships. The discussions were unusually free and form interesting commentaries upon the papers.

While the society is young in years, it is in a most vigorous condition, and its strength will increase and its field of usefulness widen as long as men known throughout the world for the work they have done continue, as at present, to add to its records by paper and discussion.

The report of the secretary-treasurer showed the society to be in a flourishing condition. There are now over 800 members and over $8000 in the treasury.

No change was made in the officers of the society, with the exception that Rear-Admiral F. T. Bowles was elected vice-president to take the place of the late Rear-Admiral Bunce.

Among those in attendance were the following:

List of Members.

Almy, Darwin, president Almy Water Tube Boiler Company, Providence.
Ayres, Samuel L. P., Chief Engineer, U. S. N. (retired), Philadelphia.
Bowles, F. T., Rear-Admiral, U. S. N.
Capps, Washington L., Naval Constructor, U. S. N., Washington.
Chace, Mason Smith, outside superintendent Crescent Shipyard, Elizabeth, N. J.
Cramp, Chas. H., president Wm. Cramp & Sons Ship & Engine Building Company, Philadelphia.
Cushing, Nicholas, draftsman, Crescent Shipyard, Elizabeth, N. J.
Deming, William Henry, draftsman and mechanical engineer Continental Iron Works, Brooklyn.
Denton, James E., professor exp. mechanics, Stevens Institute of Tech.
Dobson, Wm. A., Wm Cramp & Sons, Philadelphia.
Donnelly, Patrick J., draftsman, C. & R. Department, Navy Yard, New York.
Du Bosque, F. L., assistant engineer floating equipment P. R. R., Jersey City.
Durand, William F., professor naval architecture and marine engineering, Sibley College, Cornell University.
Eckert, Louis, Holland Submarine Torpedo Boat Company, New York.
Fletcher, Andrew, North River Iron Works, Hoboken, N. J.
Fletcher, Andrew, Jr., North River Iron Works, Hoboken, N. J.
Forbes, W. D., member of W. D. Forbes & Co., Hoboken, N. J.
Hill, Warren E., vice-president Continental Iron Works, Brooklyn.
Hyde, John S., Bath Iron Works, Bath, Maine.
Jacobus, David S., professor experimental mechanics and engineering physics, Stevens Institute.
Jordan, S. S., naval architect and engineer, Bowling Green Building, New York.
Kafer, John C., superintendent Morgan Iron Works, New York.
Katzenstein, Leopold, mechanical engineer, 357 West street, New York.
Kemble, Parker H., Columbia Engineering Works, Brooklyn.
Leavitt, Frank M., mechanical engineer, Brooklyn.
Lucas, Theodore, draftsman, Navy Yard, New York.
McFarland, Walter M., Westinghouse Electric & Mfg. Company, Pittsburgh.
McGuire, James C., consulting engineer Pittsburgh Reduction Company, New York.
Magee, Geo. W., Chief Engineer, U. S. N. (retired), Brooklyn.
Miller, Jacob W., president Providence & Stonington Steamship Company, New York.
Moore, Douglass G., president Crescent Iron Works, Elizabeth.
Niblack, Albert P., Lieutenant, U. S. N., Washington.
O'Connor, Bernard F., 59 Broad street, New York.
Palen, Frederick Pomeroy, draftsman in charge engine department, Newport News S. B. & D. D. Company, Newport News, Va.
Palmer, William Franklin, architect and managing owner Palmer fleet, Dorchester, Mass.
Peabody, Cecil H., professor of marine engineering and naval architecture, Massachusetts Institute of Tech.
Powell, Joseph Wright, Assistant Naval Constructor, U. S. N., Navy Yard, New York.
Ross, Henry Schuyler, Captain, U. S. N. (retired), Brooklyn.
Rowland, T. F., president Continental Iron Works, Brooklyn.
Rowland, T. F., Jr., secretary Continental Iron Works, Brooklyn.
See, Horace, naval architect and marine engineer, 1 Broadway, New York.
Smith, Carroll S., New York agent Wm. Cramp & Sons Ship & Engine Building Company, 100 Broadway, New York.
Stevens, Edwin A., Hoboken, N. J.
Stocker, Robert, Naval Constructor, U. S. N., Newport News Ship Building & Dry Dock Company, Newport News, Va.
Stratton, E. Platt, mechanical engineer, manager American Shipmasters' Association, New York.
Stuart, Sinclair, ship and engine surveyor, New York.
Swan, James, New York Shipbuilding Company, Camden, N. J.
Taylor, David W., Naval Constructor, U. S. N., Washington.
Taylor, Stevenson, vice-president and general manager W. & A. Fletcher Company, Hoboken, N. J.,
Thomas, Carl Clapp, professor marine engineering, New York University.
Wetherbee, Charles Phelps, assistant superintendent in charge of torpedo boats, Bath Iron Works, Bath, Maine.
Wheeler, Frederick M., secretary George F. Blake Mfg. Company, New York.
Wood, William Reuben Clark, hull draftsman, C. and R. Department, Navy Yard, Brooklyn.
Young, James, naval architect, Wm. Cramp & Sons Ship & Engine Building Company, Philadelphia.

The first paper presented at the Thursday morning session was by Frank E. Kirby, who described a

Trial of Speed Between the Steamers "City of Erie" and "Tashmoo,"

on Lake Erie, June 4 last. The "City of Erie" is a passenger and freight deck steamer in daily service between Cleveland and Buffalo. The hull is built of mild steel, divided into ten compartments by nine bulkheads, six of which are water tight. The upper decks and houses are of wood, arranged in the usual style of American steamboats. Number of staterooms, 163. Number of regular passengers allowed by permit, 600; excursion permit, 2700. This could be increased by providing additional equipment. Number of officers and crew, 108. Capacity for freight, 600 tons. Engine, single, compound beam, driving feathering paddle wheels. Boilers, six; cylindrical, return tubular. Pressure of steam, 130 pounds. Amount of coal used per round trip of 48 hours, 67½ tons; amount of coal used per round trip of 24 hours, 55 tons. Coal used on the run of June 4 was select bituminous lump from the Youghiogheny district of the Pittsburgh Coal Company's Eclipse mine.

The "Tashmoo" is an exclusively passenger steamer in daily service on Detroit and St. Clair rivers, crossing Lake St. Clair. She has three complete decks for passengers; ten parlors, *café* and buffet on main deck; smoking room on upper deck. Number of passengers allowed by permit, 3000. Number of officers and crew, 84.

Engines, inclined, triple expansion, driving feathering paddle wheels. Boilers, cylindrical, return tubular —two double ended, and three single ended. Steam pressure, 175 pounds. Consumption of coal per day, 27 tons. Coal used when running with "City of Erie" was bituminous, from the Jackson Hill mine, Jackson County, Ohio. While the usual service of the "Tashmoo" is in smooth water, she is designed, built and classed as a lake steamer, making occasional runs across the head of Lake Erie to Toledo, the southern terminus of the White Star Line. She has a heavy equipment of anchors, chains and eight large life boats. Her cross section was designed to allow the boilers to go under deck, thus leaving the main deck clear for passengers. The thin ends of the hull were cut off to reduce the weight and allow turning a reverse curve of 180 degrees in narrow waters at two landing places on her regular route. The only novel feature in her design is the gear for handling the water ballast used for trimming athwartship, and has proved of great value. Tanks are built on the guards, just forward of the wheel housings, having a capacity, when full, of 13 tons of water each. Time required to fill one tank.

seven minutes, the discharge water from the air pump being used. Time required to discharge, 45 seconds. The valves are arranged that, in any position, there is always a full outlet from the air pump. A connection is fitted for filling the tanks by the fire pump when main engine is not in motion. One man easily handles the gear, and his services are only occasionally required, except at landings.

Particulars of the steamers and data of the speed trial on June 4, as follows:

	"City of Erie."	"Tashmoo."
Length over all, feet	324	308
On keel, feet	314	300
Beam, feet	44	37.5
Breadth over guards, feet	77.2	69
Depth, feet	18	13.5
Draft, mean, feet	10.20	8.29
Displacement, tons	2,233	1,224
Trial load, tons	250	60
Boilers, cylindrical, number	6	5
Diameter, feet	12.5	11.08
Length, feet	11.75	{3 of 11.33 {2 of 22
Furnaces, diameter, inches	46	42
Grate length, feet	5.5	6
Surface, square feet	252	294
Heating surface, square feet	11,580	8,750
Draft system	Howdens.	Natural.
Steam pressure, pounds	130	175
Wheels, diameter over buckets, feet	28.5	22.42
Buckets, number	11	9
Width, feet	4	3.75
Length, feet	12	12
Dip, feet	5.17	4.75
The following are the data of the run:		
Steam pressure, pounds	120.4	175
Vacuum, inches	23.5	22
Revolutions per minute	33.25	40.08
Distance, in statute miles	94	94
Speed, in statute miles	21.76	21.70
In knots	18.899	18.847
Depth of water in feet, start	57	57
Minimum	35	35
Maximum	77	77
Average	61.31	61.31
Admiralty coefficient	178.2	225

The trial resulted in the "City of Erie" beating the "Tashmoo" 45 seconds in a run of 94 miles—less than half a second a mile. With the exception of four minutes' stop of one of the blowers on the "City of Erie," the main engines and auxiliaries on both steamers worked perfectly throughout the trial; all journals running cool. The boilers furnished a full supply of steam at all times.

The Admiralty coefficient should be considered in connection with the shallow water in which the run was made. It is estimated that the speed would have been at least ¼ mile an hour greater had the steamers been in water of sufficient depth not to be influenced by the bottom. The next paper, by Prof. Herbert C. Sadler, dealt with the

Effect of Variation of Dimensions Upon the Stresses in a Ship's Structure.

The general increase in size of vessels which has taken place within the past few years has led to many interesting problems, among which those connected with the strength are perhaps the most important. The forces which act upon a vessel may be divided into two parts: 1, those which tend to strain it as a whole; 2, those which tend to strain it locally. Of the first class those which cause bending in a longitudinal plane are the most severe, owing to the dimensions in this direction being the greatest. The general and local stresses are to a certain extent interdependent, the latter being often brought into existence by the former.

In all calculations respecting the strength of a vessel certain assumptions must be made as to the worst probable condition in which the vessel is likely to be placed, and also as to the way in which the accompanying bending moments will affect the structure as a whole. Hence at the outset it is well to remember that the calculated stresses are not necessarily absolute, but provided the conditions in each case remain the same these form a good basis for comparative purposes.

The author then analyzes the stresses to which the vessel is subjected and the effect of variation in ratio of dimensions among themselves upon the tensile and compressive and shearing stresses. The structural changes proposed are, in part, as follows:

The question as to which deck should be made the "strength" deck involves certain difficulties. Where a vessel is fitted with a long bridge house a great increase in moment of inertia may be obtained by making the bridge deck the strong one and the bridge deck shearstrake the main shearstrake. But the ends of such structures in large vessels are always giving trouble, for at the points of discontinuity there is generally an accumulation of stress, which in some cases causes rupture of the plating, even though these points have been specially strengthened. However, with careful attention to details, this objection may be overcome and a satisfactory junction made.

Similar difficulties occur with promenade decks where these are fitted for practically the whole length of the vessel. Expansion joints help to relieve the stress on those decks by allowing them to strain, but the difficulty is to know where to stop the expansion joint. If the deck only be allowed to strain, this will throw a severe stress upon the deck house plating connected to it, and if this be cut in the same way as the deck above, the trouble is passed on to the deck below. The best method of construction would be to so arrange deck houses and erections that they are independent of the main structure, but the practical difficulties prohibit the adoption of such a system. The only other way out of the difficulty is to cut the deck houses wherever possible and fit them with well rounded corners. Where discontinuity of structure occurs it is necessary not only to provide ample longitudinal strength, but also sufficient transverse strength to keep the longitudinal members to their work and prevent buckling. Attention should also be paid to the arrangement of butts, so that none of these come too near any opening or discontinuity, and also efficient compensation provided in way of openings, so that the sectional area of material is at least equal to that where no openings occur.

The connection of the double bottom with the main frame of the vessel (another point of discontinuity) has required extra stiffening in the larger vessels. The style of double bottoms as usually adopted does not lend itself particularly well to an efficient arrangement, and from structural considerations some form such as that used in war vessels seems preferable as being of a more continuous nature.

Several of the larger steamers of the present day have shown signs of local stresses at the forward end, the bottom in some cases becoming corrugated between the frames and in others being bodily set up. The cause is rather difficult to detect, but is no doubt due to pounding in a heavy sea. These parts can, however, be easily stiffened by doubling the frames and plating, and, as an additional security, increasing the riveting both in the landings and butts, for it is in the neighborhood of this part that the shearing stresses have the maximum value. In fact, the riveting in large steamers throughout requires very careful attention, more perhaps than is usually given.

Of late years large vessels have rarely shown signs of general weakness of structure, the difficulties experienced in some being due to local causes, such as the reduction of material in the way of openings or at discontinuities. Because a vessel shows signs of weakness at one particular place it does not necessarily follow that the structure as a whole is weak, and that, therefore, the thickness of material throughout should be increased. Local stresses should be met by local, and not general, strengthening.

The paper by Charles P. Wetherbee, on

Changes in Torpedo Boat Designs,

first dealt with what had been done in the way of speed by torpedo boats and destroyers. Torpedo boats of modern type have displacements ranging from 50 to 300 tons, with horse-powers from 700 to 6000. Destroyers range from 300 to 475 tons, with from 4500 to 8500 indicated horse-power. Both boats have models with a ratio of length to beam varying from 10.5 to 9.67 and a ratio of depth to beam from 0.65 to 0.75. The torpedo

boat "Biddle" measures 157 feet on the load water line, has a beam of 15 feet 6 inches, and a depth of 10 feet 9 inches. This boat was designed and built by the Bath Iron Works of Bath, Maine. Carefully made progressive trials showed a speed of 29 knots.

The author then said, in part:

The preceding data apply to the type that has been adopted by all nations for torpedo boats and destroyers. It is essentially a smooth water vessel and should be used for the purpose for which it was originally designed—*i. e.*, harbor defense.

CHANGE IN MODEL.

If these vessels are to be sent to sea a radical change in model is necessary. A vessel with a ratio of length to beam of 10 to 1, having the comparatively small dimensions of a torpedo boat or destroyer, cannot be considered of a seaworthy model, nor is it one that can be made sufficiently strong to go to sea in bad weather. Additional material worked into the long shallow hull does not strengthen in proportion to the weight added. The result of this addition is simply a great reduction in speed for only a slight increase in strength, while the seaworthiness of the model is as poor as before. The dead wood aft is usually cut away to give a smaller tactical diameter. On this account the vessel will not steer in a seaway at low speed. If the speed is increased sufficiently to steer, the shocks of the sea become too great for the strength of the hull. Even neglecting the question of increased strength it is doubtful whether a faster boat would not be obtained by decreasing the ratio of length to beam. The model that shows the least resistance in the tank is not necessarily the one which will give the greatest speed when built into a boat, because the shape may be such as to require an abnormally heavy hull to get even the small strength necessary for smooth water work. All saving in machinery weight due to using a model requiring small power for a given speed is more than offset by this extra hull weight, the result being that a model less efficient from a propulsive point of view, but having a lighter hull, goes faster.

The writer is familiar with two types of boat built to fulfill absolutely the same programme. One has a ratio of length to beam of 10½: the other has a ratio of 9 2-3. The tank shows that the smaller ratio gives a loss in speed of nearly 7 per cent. for the same indicated horse-power at the same displacement. The latter boat, however, when built, owing to a smaller ratio of length to beam, had considerably lighter hull with the same strength as the former, and was enabled to carry a greater trial load; and, in addition, to carry enough extra horse-power not only to make up this handicap of model, but to actually give 3 knots more speed and still have about 20 tons less displacement than the boat with the 10½ to 1 ratio. It is not fair, however, to credit the model with the entire difference between these boats, but a large amount is certainly due to it.

It is probable that this ratio of length to beam (9 2-3) could be reduced even more with an advantage in speed; certainly, there is no doubt but that it would make the vessel more seaworthy, and, except perhaps at the extreme speeds, more efficient from a propulsive point of view. At the reduced speeds at which the vessel is run nine-tenths of the time during her existence, the smaller ratio of length to beam is amply sufficient, and the reduced ratio of wetted surface to displacement is such that the indicated horse-power for speeds where the skin resistance is a considerable part of the total resistance would be less with the same displacement.

This large ratio of wetted surface to displacement explains why the Admiralty speed coefficient for these long lean boats never exceeds 200, even in conjunction with a fairly good propulsive coefficient. The model is finer than necessary for the speed where the maximum Admiraly coefficient occurs.

For small vessels designed to go to sea a ratio of length to beam of 8 to 1 is certainly none too small. This would probably cause a reduction of 25 per cent. in the smooth water speed, as compared with that of a model having a 10½ to 1 ratio at the same displacement. This disadvantage would entirely disappear in a seaway, and, in addition to having a hull better proportioned for strength, the vessel would be of a fit model to keep the sea in bad weather. The ratio of depth to beam (0.66) at present in vogue should not be decreased. With the ratio of length to beam of 8 to 1, and the same depth to beam ratio which at present prevails, the present scantlings for vessels of the same beam will give a fairly strong hull, if means are adopted to make the longitudinal strength members, particularly the deck, capable of developing their full strength in compression without buckling.

GREATEST BENDING MOMENT.

Unlike big ships, these small, high powered vessels develop their greatest bending moment in sagging when the ends are supported on the crests of two adjacent waves with the middle in a hollow. The bending moment under these conditions for a vessel having a 10 to 1 ratio is nearly three halves of that found when the conditions are reversed, and when the shock which results from jumping the vessel at high speed into a fairly heavy head sea is added to this bending moment, the compressive stresses in the upper longitudinal members are by far the largest that have to be taken into consideration. As the strength of the deck against buckling in compression depends upon the moment of inertia of the cross section and the modulus of elasticity of the steel, and not upon its compressive strength, the futility of the frequent attempts to increase the strength of his class of vessel by simply using stronger steel without increased scantlings becomes apparent when it is remembered that the modulus of elasticity varies only 3 per cent. from 29,000,000 throughout the range from the softest flange steel to the hardest tool steel.

Another frequently made mistake caused by this same constant value of the modulus of elasticity of all steel is the allowance in calculations of a fictitious thickness for stronger steels when used in conjunction with mild steel in tension, after which the augmented area so obtained is credited with the full strength of the weaker steel. This is wrong. The two classes of steel have the same modulus of elasticity and only offer resistance in proportion to their actual areas when subjected to stresses within their elasticity limits. What actually occurs is that the weaker steel in this combination passes its elastic limit first, thus throwing nearly the entire stress upon the remaining stronger steel, with disastrous results.

In order to obtain sufficient compressive strength in the deck, other means than the mere thickening of the plates must be resorted to if a respectable degree of lightness is to be retained. To this end, longitudinals of angle, bulb angle, or, wherever possible, of plate, should be worked under the deck not over 2 feet apart in a manner similar to that by which the bottom of the boat is reinforced, and a 1½-inch non fire proofed wood deck thickly fastened to the steel is also of great advantage in preventing the deck plate from buckling, also solving the problem of giving a deck which offers a proper foothold in a seaway.

STRONGEST CROSS SECTION.

The nearer the midship section of a vessel approaches a tube in shape the stronger the vessel will be, and all longitudinal members are stronger in compression if given as much curve as possible in the athwartship direction. As great a crown of deck as is compatible with its use is desirable for this reason. Flat surfaces should be avoided everywhere. They are weak under all stresses, except direct tension.

FAULTS PECULIAR TO UNITED STATES BOATS.

In addition to the unsuitable model the torpedo boats and destroyers of the United States Navy possess some faults peculiar to themselves. They have too many useless fittings and attachments. Their machinery, through complication, is too liable to break down. Both hull and machinery have unnecessary weight devoted to the unimportant details that would serve better if expended on the vital parts.

It is unfortunate that officers connected solely with torpedo boats and destroyers in each of our designing bureaus in Washington are not usually on duty there long enough to follow a design made by them through

the various stages of construction to the completed vessel. The torpedo boat suffers more than large ships from this system. The lightness of touch and line of thought necessary to design and construct a successful torpedo boat are instantly lost if the same man has charge of large ship work at the same time. It would also be of advantage to the design of a torpedo boat as a whole if some one man of great experience with them could have the final decision concerning all matters entering into the design, no matter which bureau has cognizance of the same. Many articles now creep in that are unnecessary, and some things even are duplicated through being specified by two bureaus.

This man should also be able to take a bird's-eye view of the vessel as a whole, irrespective of the department, and at the same time should be able to see in his mind's eye everything as it will finally be installed in each individual department.

Space is very limited in these boats, and, although each article in itself, as its drawing comes up for approval, does not look to be much, the combination of all the individual articles specified, drawn and approved, one at a time, frequently presents great difficulties owing to the lack of space, and, if installed, they are inaccessible.

It is stated that a certain great shipyard in Europe has a high salaried official, whose sole duty it is to go over the ships built by that concern and make a list of what can be left off in future vessels. There is certainly a great field for him on board our torpedo boats and destroyers.

PARTS WHICH SHOULD BE OMITTED.

The following should be omitted from the hull and equipment as being out of place on vessels of this class:

Complicated drainage systems.

Water tank magazines with their flooding, draining, lighting and ventilating apparatus for fixed ammunition.

The entire system of bells, push buttons and annunciators, with their accompanying wiring in conduit and distribution boxes.

All voice pipes except from forward conning tower to engine rooms and to after conning tower.

The system of wiring in conduit and the type of fixtures for the electric plant.

In the steam engineering department of torpedo boats and destroyers there are too many units of all descriptions, too many compartments; in some cases, too many boilers and too many engines, too many cylinders to an engine, too many blowers, too much pipe, too many valves and too many ways of doing each particular maneuver with the piping. The weights are pared too fine on the main engines, boilers and blowers, while the piping, valves, fittings, manifolds and other auxiliaries are no lighter than on any other class of ship. Pipes need not have the same allowance in thickness for wear as is given to a battle ship, as the vessels are shorter lived.

ENGINEER STAFF TOO SMALL.

The engineer staff allotted to torpedo boats is far too small, as will be seen by comparing the number of men allowed with those assigned to any other naval vessel of the same horse-power. This is unfortunate, for no other type of machinery deteriorates so rapidly from neglect or requires more expert supervision.

With this small staff in view, everything should be made as simple as possible. As we have to admit once for all that these vessels are not fit for sea going work, the evaporators and especially the distillers, with their accompanying piping and pumps, should be dispensed with and be replaced by reserve feed tanks. Ash ejectors with their piping are useless.

Four-cylinder main engines take more care and room than those with three cylinders, besides using more steam. The same power is much more easily cared for and is lighter if generated in a small number of large boilers than in a large number of small ones.

Almost no attention is paid to the economy of coal consumption. The prevailing idea that the lightest machinery can be obtained by making as light an engine as possible without regard to steam economy is erroneous, for the penalty is paid when it comes to the boilers. They are far heavier than would be necessary if a little more weight were devoted to the engines to obtain a more economical use of steam.

The above faults are in all cases not errors in design, but they simply result from the fact that these things are inappropriate on a harbor defense torpedo boat, while they are absolutely necessary on a sea going battle ship.

The solution of the so-called torpedo boat difficulties seems simple enough. The features criticised in our present boats are largely the outcome of the attempt to use the boats in a service for which the type was never originally intended. They must be restricted to harbor defense, and a new type more in the nature of dispatch boat must be designed for sea going work.

FEATURES OF NEW BOATS.

These new boats must be safe at sea in any weather, and the larger ones (from 400 to 600 tons) must be able to make good speed in anything short of the worst weather. Unlike the torpedo boat, which must be invisible above all things, these boats must have enough freeboard to make them seaworthy. They should have sufficient dead wood aft to make them hold their course at low speeds in bad weather, and if a small tactical diameter is deemed necessary, add a bow rudder to get it, especially in the single screw boats. They must have a ratio of length to beam of at most 8 to 1, with a ratio of depth to beam of 0.7. Make the hulls amply strong, and if the vessels are of 200 tons or under use the composite construction instead of steel plating for shell and deck. After a strong, seaworthy hull and ample necessary equipment and ordnance are provided, I would turn my attention to getting as much simple, reliable power into them as possible with the necessary coal and water. These vessels must have evaporators, but I do not regard distillers or ash ejectors as necessary.

As to machinery, I should use a reliable type of bent tube water tube boiler and rugged three-cylinder triple-expansion engines throughout the class. The engine cylinder ratio should not exceed 5 to 1, as these boats will run most of the time at reduced power.

I would never use two engines where one would do. Providing for emergencies in the way of break downs, by duplicating moving parts in the smaller class of boats, is more likely to be the cause of these same break downs. As boats having less than 1000 horse-power will hardly be constructed for this service, we can neglect any powers up to that amount. The arrangements for powers above 1000 would be as follows:

1,000 to 2,500 indicated horse-power, 2 boilers, single screw.
2,500 to 4,500 indicated horse-power, 2 boilers, twin screw.
4,500 to 8,500 indicated horse-power, 4 boilers, twin screw.
8,500 to 12,500 indicated horse-power, 6 boilers, triple screw.

These powers are the forced draft power, and they could be maintained for only about four hours. The cruising power would be about half of the maximum.

Triple screws are adopted for the larger powers, as their engines fit into boats of these dimensions better than large twin screw engines, and at the same time the proper propeller area can be obtained without excessive draft of water.

Discussion.

The paper provoked a lively discussion. The sweeping criticisms and the bold suggestions excited a deep interest in those present. The statement that boats of this character should be designed under one responsible head met with general approval, but no recommendation was made as to how this could be accomplished. One speaker said that the solution was easy even under the present system, where many are supposed to be responsible. "All you have to do is to put in your own appliances and throw the other fellow's out. This would insure, in your own opinion at least, the survival of the fittest."

Another member said that at the present time there is nothing approaching uniformity in the designs of these boats. The 30 boats of this type now in the navy are constructed in accordance with 17 different sets of plans. Standard fittings are used alike on destroyers and battle ships, no attempt being made to reduce their weight for the former, even when this would be possible.

Rear-Admiral Bowles said: "The paper hits all branches of the Navy Department so indiscriminately and so severely that there can be no hard feeling." The Admiral did not believe in the notion that boats of this type were only good for harbor defense and operations in smooth waters. "Their place is with the fleet and they have got to go to sea."

A paper by Capt. E. B. Babbitt on

Recent Experiments in Attacking Armor With High Explosive Shell

is of timely interest, considering the experiments now in progress at Sandy Hook. In part the paper was as follows:

The struggle between the armor and the projectile is drawing to a close. The limit of flotation has practically settled the thickness of armor to be carried, and the manufacturers now bend their energies, with remarkable success it is true, to improving the armor. With all this, however, the projectile is in the lead, and has now brought to its assistance the valuable aid of high explosives.

The Ordnance Department of the army has been experimenting for many years to secure a high explosive for a shell filler, and with varying success. In the reports of the Ordnance Board conducting these tests in 1883, 1884, and 1885, they usually concluded with "burst at the muzzle" or "destroyed the gun." Naturally, then, the problem, as it presented itself to them, was to secure an explosive that could safely be fired from a high powered gun. As we approach it now, that is really but a corollary to the condition that it will not explode on impact on armor, as the shock in the latter case is so much greater.

After detailing the objects aimed at in these tests and describing the methods followed, the paper states:

Both explosives having met all requirements up to this point, there remained the final tests against armor.*

Twelve-inch armor piercing shot, having sufficient velocity for penetration, are required to pass through a 12-inch face hardened plate before the lot represented by the projectile is accepted. This was, therefore, adopted as the final test for the explosives—namely, that they must withstand the shock of impact of such a projectile on such a plate. It was led up to by firing first a 5-inch shell through a 3-inch tempered plate. Next, a 12-inch A. P. shell through a 7-inch tempered plate, and, finally, a 12-inch A. P. shot (capped) through a 12-inch Harveyized plate. All the above were unfused, and in every case the projectiles were recovered and later fragmented to increase our data on this subject. It should be stated that all armor plates are supported by heavy backings of oak strongly braced, and in rear of this is a large mound of sand in which the projectile finally comes to rest. At last the final test was reached.

Imagine the tension as, from a safe distance, we stood with eyes to our glasses anxiously watching the distant field. The target, a 5¾-inch tempered steel plate, well backed with oak, defiantly faces the long, slender 12-inch rifle. The red flag waves from the firing bomb proof. It is answered. The flag falls, a bank of smoke from the gun, a flash of light at the plate, a dense, black, foreboding mass of smoke, interspersed with flying timbers and bits of plate, two mighty roars in quick succession, a sigh of relief and satisfaction from the observers, and, for the first time, a 12-inch armor piercing shell, loaded and fused, has passed through heavy armor. While later heavier plates were used and the results therefore more satisfactory, the first success ever stands out most vividly in the minds of the experimenters.

The official record of this test reads as follows:

No. 7. Twelve-inch A. P. shell charged with explosive "D," 58½ pounds. Weight of charged shell complete, 1021 pounds.

Fired March 27, 1901, with Frankford Arsenal detonating A. P. fuse complete against 5¾-inch tempered steel plate. Striking velocity, 1475 foot-seconds. Shell penetrated plate and detonated immediately in rear. Plate broken and carried forward with numerous fragments of shell.

Tests against 7-inch steel plates and 12-inch face hardened plates followed with great success. Finally, encouraged by the successful results, a 12-inch A. P. shell (the test of which is a 7-inch steel plate) was fired against a 12-inch face hardened plate. The record reads:

No. 11. Twelve-inch A. P. shell charged with explosive "D," 58.6 pounds. Weight of charged shell complete, 1010 pounds.

Fired May 17, 1901, with Frankford Arsenal detonating A. P. fuse complete against a piece of 12-inch face hardened steel plate. Pressure in gun, 29,900 pounds per square inch. Velocity, about 1875 foot-seconds.

Shell detonated in plate and completely demolished plate and backing, all being carried forward and swept away. Fragments of plate were thrown to a distance of 200 to 300 feet and gave evidence that the plate was penetrated by the shell.

In summing up the final tests we find:

	Explosive "D."	Maximite.
Shell fragmented by detonating fuse	8	11
Shell fired from gun unfused	13	13
Shell fired from gun fused	13	10
Totals	34	34
Results entirely satisfactory with respect to explosive	34	33
Premature action of explosive, cases afterward remedied	..	1
Fuses acted feebly—remedied	3	1
Fuses failed	1	..

Before closing it is necessary to mention a most important factor in this success—namely, the fuse. But of this little can be said. It is the secret of all our triumphs and as such is being carefully guarded. It, like the explosive, passed through various stages. It was tested separately for its power to detonate the shell charges, its power to resist shock of discharge and impact, and, finally, under service conditions. It had its failures in the early stages, but, thanks to the skill and energy of Capt. Beverly W. Dunn, Ordnance Department, U. S. A., won out in the end.

One of the most serious questions connected with an armor piercing fuse is its delay action. Introducing, as it does, the time element, it is evident that an interval suited to light armor would not be satisfactory for heavy when the time of penetration is greater. As by far the greater part of a ship's protection is relatively light armor, a delay sufficient to cause detonation a few feet after penetration seems best. This gives us a burst when a shot is still in the 12-inch plate, but has penetrated.

I think I am safe in saying that the results just enumerated are unique, and so far surpass those previously obtained as not to admit of comparison with them.

[Some of the other papers read at the convention will be considered in later issues.].

* These explosives were Maximite and explosive "D."

Shenango Valley Notes.

The New Castle Forge & Bolt Works, a recently organized concern, have secured a charter at Harrisburg and have purchased land for their plant in the vicinity of New Castle. The company will turn out nuts, bolts and chain, and will begin work about January 1, 1902, with a force of 100 hands. T. F. Morehead of New Castle is an active promoter of the enterprise.

The Universal Sanitary Ware Company have just started up their new plant at New Castle. The plant is not entirely completed, but parts of it have been put in operation.

The New Castle plant of the National Steel Company has been suffering from a scarcity of coal.

Since the Carnegie Company assumed control of the New Castle steel mill there has been inaugurated a weekly meeting of the foremen of the several departments, at which suggestions and criticisms are received. The plan is already resulting in an increased output.

W. H. Lewis, for several years superintendent of the New Castle steel mill, has accepted a similar position with the Sharon Steel Company.

The Pennsylvania Engineering Works, at New Castle, are finishing an order of cinder cars for the Ohio plant of the National Steel Company, Youngstown. A number of large straightening presses, to be run by electric motors, are being built for the Lake Superior Power Company of Sault Ste. Marie.

The plant of the Atlantic Works of the Republic Iron & Steel Company, at New Castle, is receiving some important improvements. New heating furnaces are being erected and the mill will be lighted by electricity.

The Correct Treatment of Steel.*—II.

BY C. H. RIDSDALE, F.I.C. (MIDDLESBROUGH).

Reheating.

When material which has been worked below critical temperature and hence is distorted and strained is reheated, as the temperature rises the reverse effects take place to a large extent, there being no external work. After passing above blue heat the grains and the cement holding them together get softer and begin to yield[1] to the internal strains till they adjust themselves, and so, although the mass retains its new shape its internal structure is rearranged and the strains redistributed or removed and the material loses its rolling hardness and becomes soft and tough again. This is true annealing.[2]

Just, however, as the cement in cooling below red heat became harder than the grains, so in reheating correspondingly; at these temperatures the grains are still softer and hence if the heating is rapid the grains soften more quickly than the cement, and it is they which yield to the internal strains (already existing and also set up by rapid heating) and become pulled asunder or out of their more or less regular shape into new and more interlocking shapes and are thus broken up. This even applies to the large grains of material finished too hot, and is particularly important because material predisposed to be brittle, from either being finished at too high or too low temperatures, regains its good qualities if rapidly reheated. If the heating is more gradual the strains operate less violently, and, though the softening effects are to some extent obtained, the breaking up is less marked. Hence the importance of the heating being rapid to obtain the maximum softening effect.

When the temperature rises above critical point again, the cement becoming softer than the grains, they follow the natural law of attraction and tend to aggregate into larger grains with thicker intervening bands or cement, just the same as before the material had received sufficent work at a temperature below critical point; the higher the temperature the more this is so, and the slower the cooling the more it is visible when cold. The same law is always ready to come into operation even at lower temperatures, but at or near blue heat the cement is so stiff and offers so much resistance that it is unable to do so, although at temperatures considerably below the critical point[3]—the lower reds—provided the time is sufficiently long, a similar result is obtained. Annealing may in either of the above ways be carried too far so as to be injurious.

Fatigue and restoration by rest come under this category, as they are a continuation of the law at still lower temperatures, but as these are not strictly "treatment" they are not discussed here. The converse fracture by vibration and alleged growth of grain and consequent brittleness or loss of nature (strain or incipient rupture) might be considered treatment as being a contributory cause to faults developed; probably when this occurs the coarse grain was already existent and rupture only ensued from vibration causing cracks to develop.

When the temperature rises considerably above critical point and approaches setting or melting point the cement again becomes too soft to hold the grains firmly and, their coherency becoming less, the stage of red shortness is once more reached. Thus we see one reason why overheating produces red shortness. Another is the burning out of the carbon from the carbide of iron in the small quantity of cement; thus it loses its nature and ceases to act as such, or, if carried too far, not only may the carbon have been burned out, but there may be even substituted a film of oxide, which reduces cohesion still further. It is easy to understand from the above how the presence of a little carbon, say 0.1 per cent. to 0.15 per cent. (or similarly of manganese, silicon and possibly even phosphorus), enables the steel to stand more fire (*i. e.*, heating for a longer time or to a higher heat provided it is below the temperature of red shortness) without exhibiting want of cohesion during or after working from this cause, this quantity taking longer to burn out than, say, 0.05 per cent. to 0.07 per cent., but at the same time if it gets higher than this there is so much more cement that it becomes soft too readily and the grain is too much cushioned and does not get worked enough, hence higher carbon steel requires to be worked at a lower temperature for the grain to be sufficiently acted on and at lower temperatures strains are more readily set up. Similarly steels with little or no carbon (like iron) have so little cement that they do not lose their coherency at a temperature at which higher carbon steels with more cement would, and hence will bear a higher working temperature without falling to pieces, though they are better without it unless wanted very soft.

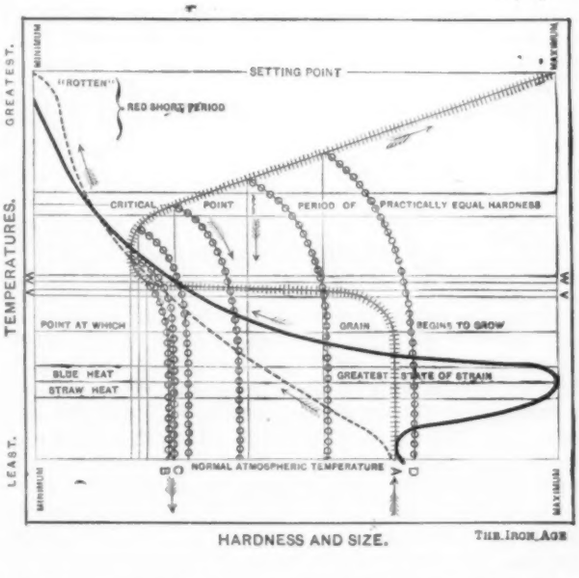
Diagram III.

The behavior of steel at different temperatures would seem to suggest the occurrence of the following

CHANGES IN THE "GRAIN" AND "CEMENT" WHILE REHEATING.

HARDNESS, or want of plasticity of cement.
HARDNESS, or want of plasticity of grain..
SIZE OF GRAIN* (affected from the point at which growth begins to a point beyond W by internal strains).....
GROWTH OF GRAIN from cessation of heating .....
CHILLING—Size of grain when arrested by this .....

* The size of grain at commencement of reheating is..shown at A
Reheating only to W gives the finest grain obtainable with slow cooling..... " " B
Reheating a little (say 100 degrees C.) above W, by allowing more regrowth, gives a slightly larger grain..... " " C
If reheated to a sufficiently high temperature the grain has grown again so much as to be larger than before reheating..... " " D



Section V.—Samples of Processes and Treatment Steel Has to Undergo in Present Practice, with Such Modifications as Scientific Principles Seem to Suggest.

TREATMENT BY THE MAKER TILL IT LEAVES HIS HANDS.

Rolling Ingots.

a. For steel which is going to be reheated and worked further exactly as it is sent away, without undergoing any preliminary process, the limits of the temperature at which work is finished are not set by and are immaterial so far as their effect on its ultimate properties are concerned, since whether it is finished hot or cold and the grain is too large or too small, the respective effects of this will (as has previously been shown) be completely removed on reheating and working further.

* Paper read before the Iron and Steel Institute, September, 1901.

[1] The point at which this takes place at all rapidly has been termed "V" by Brinell, but, as pointed out later, it has been proved that, given sufficient time, it begins sooner.

[2] Of course this treatment will not remove actual rupture which has already taken place, though no doubt further work at a high temperature would cause it to weld up.
Annealing has two actions:
1. Removing the rolling hardness. This is done whether it is heated to a pretty high temperature, say 950 or 1000 degrees, as well as if only heated to "W," say 730 to 800 degrees.
2. Making it fine grained, for which reheating should only be to or slightly above "W."

[3] Stead has traced it down to (low red) 600 to 750 degrees C., 48 hours. "Brittleness in Soft Steel Produced by Annealing," pp. 9 and 33.

But the maker is forced for his own sake to observe certain limits; for if he rolls too hot or before his ingots are set he will make defectives, while if he rolls too cold he will strain his machinery, and in either case his sections will be wrong, and these limits more than cover the requirements of the properties of the finished steel.

b. If the steel is not going to be reheated and worked till it has received some preliminary treatment (such as cold shearing), or if it will be used without further treatment, the finishing temperature and rate of cooling do matter. There should, of course, be sufficient work at a sufficiently low temperature to well knead the material and reduce its grain, thus making it tough, but it must also be finished at a sufficiently high temperature to avoid inducing brittleness or undue rolling hardness. Unless in exceptional instances and for special purposes, above bright red, 850 to 900 degrees C., is too high, and below low red, 600 to 700 degrees, is too low. The exact temperature must be determined for each particular case and according to tests required.

For example:

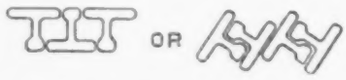
Rails.[1]

So long as these meet the specified tests without difficulty it may not be thought worth while taking any steps to follow exact scientific principles, even though the quality of the material would be rendered still better thereby. Medium heavy sections generally finish within the right limits and meet the tests easily, but it sometimes happens that with the two extreme weights, they are not so readily met.

Heavy Sections, particularly double head and bull head, 90 to 100 pounds. The tendency is to finish at too high a temperature and get too large a grain, especially as they are hard (carbon, 0.35 to 0.50 per cent.), and pack on the bank into a close, solid mass, and thus cool slowly. They may be quite soft to dead load, but wanting in toughness under ball test on account of this large grain.

When they cannot be rolled cool enough (say low red) they might, perhaps, be air cooled more rapidly, by spreading or other means.

Light Sections, particularly flange rails, 35 to 50 pounds. The tendency is to finish at too low a temperature, especially for the flanges. This is the more so as they do not pack so solidly together. They may be very rigid under dead load and show too hard, or be



Massing Rails to Retard Cooling.

wanting in toughness under ball test, owing to the thin parts being rolled too cold, and the strain set up by the unequal finishing temperature and rate of cooling. If they can be finished hotter, say the heads good or cherry red, or by any means massed more and the surplus heat from the head made to retard the cooling of the flange, such as standing them alternately on their flanges and heads, this ought to be beneficial.

An arrangement of this nature is adopted at Homestead on the intermediate cooling bench, and is being introduced at other American works.

Girders and Other Sections.—These being used for structural purposes or without further treatment than drilling, the finishing temperature and cooling may usually be regulated, mainly with reference to giving the right tests, so long as the extremes mentioned in the general directions are avoided. This will generally be from low to bright cherry red.

Plates.—Much the same may be said of these, but they may receive treatment which will develop brittleness that it will probably be out of the power of the maker to anticipate and counteract. (This to be described for users of plates.) As these may have to be sheared, note next paragraph.

Bars Which Have to Be Cold Sheared Before Reheating.—As these should cut soft, it is very important, especially the larger the mass, that they should be finished at a good cherry to bright red (say 800 to 900 degrees C.), well above anything like blue heat, and cooled slowly, and should not be in any way chilled, especially at or near blue heat, either entirely or locally. Even chilling right out from red hot would not have half so injurious an effect.

Any chilling of a mass by which a part is chilled for some time may be particularly detrimental, as the hotter parts may maintain the part being chilled at a blue heat all the time the mass is cooling, and the strains be intensified thereby. As an instance, on a wet day, a leaky roof letting water trickle onto a bar or plate all the time it is cooling, or chilling with a hose, if in haste to load the material, may set up very great strains. Cooling strains are well recognized in castings, and great attention is paid to proper stripping, &c.

However, even should the bar cut brittle through finishing too hot or too cold, or through chilling, the harm ends here, as once it is reheated and reworked all injurious effects will be completely removed.

The top and bottom limits of temperature between which work should be finished are shown approximately on the accompanying diagram.

Diagram IV.—To Illustrate General Idea of Temperatures.

Neither the critical temperature nor the best finishing temperatures can be measured accurately, as they can only be judged in practice by the eye, and the description of what this sees may not convey the same idea to others.

Campion's* limits for best results for carbon —0.44 per cent. to 0.20 per cent. for reheating (= "W"), marked.....C } Connecting line.

Ridsdale's† limits for best results for carbon —0.16 per cent. to 0.03 per cent. for continuing work down to, marked.....R

If, as per Howe,‡ 30 degrees is deducted (from Campion's figures) to give temperature to continue work down to, *i. e.* for material cooling (= "V"). } Connecting line

The best finishing temperature may be higher or lower, according to mass, &c., and not always within these limits.

Thus the finishing temperature given by Hunt§ for 80-pound rails at Edgar Thomson are marked.....E T

The finishing temperature given by Hunt for rails at Joliet are marked..... J

The critical temperature (at which grain begins to be appreciably affected by work) will be above the top limit of the "best" temperatures, and if it corresponds with them will probably follow the line.....

[1] For full particulars *re* rail questions, see Sauveur, "Microstructure of Steel," *Transactions of the American Institute of Mining Engineers*, August, 1893; Hunt, "Finishing Temperatures for Steel Rails," *Transactions of the American Society of Civil Engineers*, vol. xvi, p. 283, and others (list of Hunt's papers in his latest). See *Iron and Coal Trades Review*, June 7, 1901, p. 1185.

* *Journal of the West of Scotland Institute*, January, 1901. "Some Experiments on the Annealing of Steel."

† Discussion of Campion's paper, "Best Temperatures for Reheating of Steel," 0.03 to 116 per cent. C., 900 degrees C. Discussion of Stead's paper on "Brittleness in Soft Steel Produced by Annealing," *Journal of the Iron and Steel Institute*, 1898, No. II, "Best Temperatures for Working Down to Lower Limit, 750 Degrees C."

‡ Harbord and Twynam, *Journal of the West of Scotland Institute*, No. 6, March, 1898.

§ *Iron and Coal Trades Review*, June 7, 1901, p. 1185.

It should be borne in mind that the larger the mass the less work it will have received (besides being hotter inside than it appears to be), and hence the larger its grain and the more slowly it will cool; so it should be finished cooler than a smaller mass, which will cool more rapidly, or else the large sections should be spread out and cooled more rapidly, and small sections massed and cooled more slowly.

Treatment by the User.

ROLLING AFTER REHEATING.

The main points to observe are:

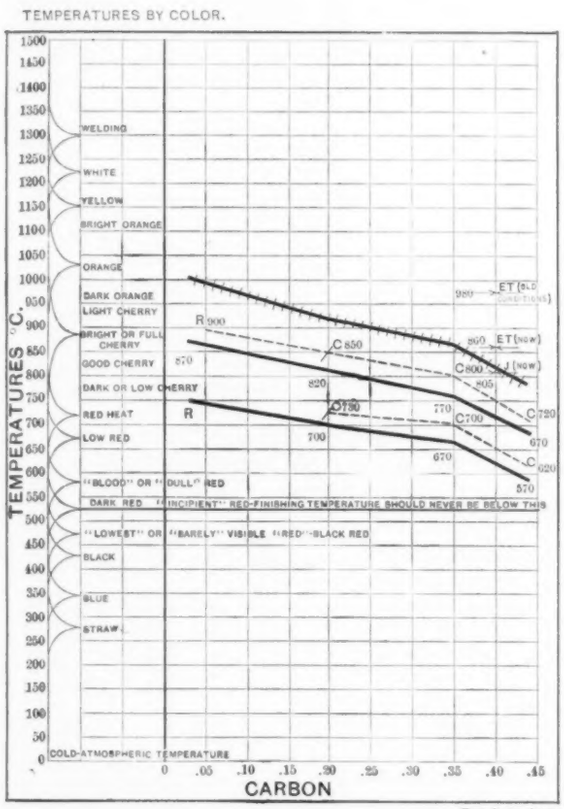
1. Reheat as rapidly as possible consistent with the mass, in order to break up the grain. Gradual heating does not do this so effectually.

Masses, such as ingots or blooms large enough to crack by very sudden heating, must, of course, be heated more cautiously, and also require proportionately more time, and must have—

2. Sufficient time to heat all through, otherwise work will cause unequal extension and lead to internal tearing or separation (lamination and so-called "hollowness") of the mass. At the same time do not soak—*i. e.*,

leave in the furnace—any longer than is just necessary to heat all through; two to three hours at harmless temperature (and perhaps less according to mass of piece and temperature of furnace) is quite enough to make the piece very coarsely crystalline,[5] and this if rolled quickly, so as to finish hot, and cooled slowly, may easily give a product which has coarse grains and is more or less brittle or "rotten." Remember that if there is delay (from breakdown or other cause), damping down till ready for work will (by allowing very gradual cooling) permit and not prevent growth of grain.

The best plan is to draw the blooms, &c., and spread them so that they cool rapidly, then later, when reheating, the grain will again be broken up. Failing this, when they are worked, finish them rather cooler than usual, to reduce the grain more (but not below red or blue heat), and spread out so as to cool rapidly. This is somewhat risky, however, as if the grain has already grown large, and the steel is worked to at all too low a



THE IRON AGE

temperature so that strains are set up, it will be still more brittle.

The best and only certain course to determine the most suitable temperatures for finishing is for each user to make actual experiment with the various sizes he rolls, so that when such circumstances arise he may know exactly what to do. It is very little trouble to try a few short pieces of the same bar at different finishing temperatures and rates of cooling, and make mechanical bending tests, &c., on these. The best test, when the pieces are not too large, is the shock test on a V-block—no nicking; nicks are not uniformly deep—while slow bending or tensile tests do not always show up the changes.

3. Don't burn; if using hot furnace, or with thin goods, such as merchant iron, small sections with a lot of work on them, &c. There is more likelihood of this when rolled into thin deep **I** or ⌊ sections, and the pieces are rolled very hot. It may seem superfluous to give this caution, but instances are sometimes met with where only one edge out of two or more (and this, perhaps, only in parts) is cracked, the others being quite sound, and yet the steel is blamed.

[5] Ridsdale, "Brittleness in Soft Steel," *Journal of the Iron and Steel Institute*, 1898, No. 1.

4. Don't overanneal, if the product is to be annealed. If it is of large mass, &c., unless it has received plenty of work and been finished at fairly low temperature, say low red (600 to 700 degrees C.), don't put while still hot in a pit in the ground, or in annealing furnace, or even stock in large heaps, lest the very slow cooling may cause the grain to grow. This would do good to small sizes finished at low temperature (dull red or lower); but by far the best annealing is to let the steel get cold first and then reheat rapidly to cherry red for a short time, afterward let cool again fairly rapidly (don't chill if hard carbon).

The Forge.

Forging.—What has been said as to rolling of the temperatures for finishing work as well as of cooling applies here, though even greater attention is required to these points, since the shapes of the finished forgings are relatively less simple, and thus internal strains may have more serious results.

It is, of course, particularly important that the steel should be sufficiently plastic for work to thoroughly penetrate the mass and cause the material to flow evenly, otherwise separation of the fiber or hollowness may occur in places.

Bear in mind the lines of flow already existing in the piece, as when it is possible to get the required shape

Fig. 1.—Crank Shaft Bent Gradually.

Fig. 2.—Crank Shaft with Sharp Angles.

without too sudden interruption of these, the forging should be stronger and tougher. For instance, a crank shaft bent gradually, Fig. 1, so that the lines of flow are also bent round, as in the dotted line, should be stronger than one in which their direction abruptly changed, Fig. 2, or continuity was interrupted by machining.

When a whole piece is heated and only part of it receives work, if the heating is gradual and lasts long (particularly if there is more than one heating, the piece not getting below low red each time), a large grain may be developed which is not broken up in the unworked parts.

On the other hand, if only part of the piece is heated, as it passes through all gradations to cold, there must be a place where it is at blue heat, and the jar from each blow will reach this part.

Thus in the one case the large grain, and in the other the strains set up, may result in fracture, though perhaps not till some time after. Seeing, therefore, that there is a weakness or internal strain in every forging, it is desirable to remove this, and the most effective way is to let it cool and then reheat from the cold as rapidly as possible consistent with the mass to cherry red, taking care that either the whole is reheated or that reheating overlaps all parts which had previously been at a blue heat, or had been reheated whether with or without work.

Even though the area to be so reheated is too great to do all at once, it will suffice to do it in successive portions. Reheating thus conducted will break up the grain, and cooling can take place naturally in the air with no special care to retard it, unless it contains over 0.30 per cent. carbon, or is rendered necessary for some special reason (such as a very irregular distribution of mass). It will be noted that although detrimental effects might arise during forging, when, owing to the en-

tire piece not being heated, there was a part at blue heat, these ill effects would not arise in reheating as above, although there might then also be a part at blue heat, because in the latter case there would be no work and no vibration to affect such part.

From the foregoing it is obvious that work should never be continued on any part which is below fair to cherry red (say 800 to 900 degrees C.), though sometimes in practice it is continued to or through blue heat to give it a good finish. Any one who has by practical experiment seen what light blows at this temperature will render a comparatively large mass brittle will realize how unwise such treatment is, and how very necessary an annealing by reheating as described becomes in cases where work has been continued to these low temperatures.

Drop or Press Forgings.—The numerous small articles which are forced into shape between dies with one or more blows or rapidly applied pressure, while the steel from which they are made is, in order that it may be sufficiently soft, at a welding heat, are liable to have a coarse grain and consequent brittleness or "rottenness," because of the high temperature at which the work on them is finished, there being frequently no work below critical temperature. As an instance of this, the writer can cite one of the cranks of a bicycle of well-known good make, which, though of excellently pure consumption:

	Per cent.
Carbon	0.12
Silicon	trace.
Phosphorus	0.04
Manganese	0.60

broke short off while he was riding on level ground, and exhibited a very coarse fracture. There was clearly nothing whatever the matter with the steel itself, but only with the treatment it had received. Had it been rapidly reheated to cherry red as described, its grain would have become fine and toughness been restored.

The Blacksmith's Shop.

Forgings.—What has been already said as to these applies with as much or greater force here.

Perhaps the practice of putting a nice finish on forged pieces by keeping on hammering them through low red and blue heats is commoner here than in the forge, and needs special attention called to it.

The writer has often seen eye bolts and other articles which had to bear considerable weight treated in this way, and has also seen numbers of the same when they had mysteriously broken.

Welding.—Every blacksmith understands that if he continues to sizzle a piece to be welded too long he will burn it, but a great many do not know, or do not act as if they knew, that any part which has been raised for a minute or two to welding temperature, and has not afterward received sufficient work at a low temperature, has developed a coarse grain, and is probably brittle or rotten, particularly if the pieces have been cooled very slowly.

This applies to iron as well as steel. Any one who notices the various fractures that can be seen in any large works of articles that have been welded—pieces of rods, bolts, links of chains, &c.—will see that a large proportion of them have very coarse grain, the coarseness having probably arisen from this cause.

But whether a piece has been worked too hot or too cold, or has not received work after having been at a welding temperature, the cure is as already described—reheating the whole of the parts so affected rapidly from the cold to cherry red, and then letting cool naturally in air.

Every blacksmith also knows that if he wants to make a good sound weld—practically as strong as the unwelded part—he must use sand or some other flux to cause the infusible scale or oxide to flow away from between the faces to be welded, and let them unite cleanly.

The writer is aware that in many works, and in different processes of manufacture, owing to the excellent nature of soft steel and the great ease with which it welds, a flux is not used, and that notwithstanding this on the whole it gives satisfactory welds. For instance, the writer has seen 3 x ¾ inch bars being simply looped till one part lay on the other, and then welded without

any flux at the parts touching each other. But it is easy to understand that a very slight increase in the temperature of the piece or the length of time it is exposed to that temperature (and it is not conceivable that these conditions are always quite uniform) may so increase the thickness of the scale or burn the nature out of a thin piece, that if it welds at all the weld is imperfect. If this is the case, the steel maker is probably told his steel is at fault.

However justifiable or desirable for convenience welding without a flux may be, it is not treating the steel in the way to get the best results from it, and the writer cannot think that such welds as a whole can be made with equal certainty, or be as reliable when made, as those made in the good old fashioned and at the same time scientific way—viz., with a flux, and he would like to have this point discussed fairly and squarely by some one who does not use a flux.

Tubes.—These are generally made from slabs which are first rolled to strip—perhaps at a different works to the tube maker's. The strip is reheated, bent approximately to the shape of the tube, and the lap formed, after which it is heated for a short time to good welding heat, drawn over the mandrel, and welded without a flux being employed.

None of these preliminary reheatings need be very high, and it is obvious that where material is heated several times and finally subjected, while only thin, to a very high temperature, that great care is necessary throughout to avoid burning the nature out of the steel.

The writer has been told by a tube maker of the highest standing that the furnaces at his works in which this final heating was received were often at a temperature of 1800 degrees C., and that one and a half minutes might be sufficient, while two minutes would spoil the steel; also that the temperature was constantly varied at the workmen's discretion, and there were generally several tubes in at once.

Often steel receiving such treatment is not more than 3-16 inch thick, and the work is done so rapidly as to be finished above critical temperature, resulting in the grain being coarsely crystalline, which is unfavorable for cold expansion tests.

Such conditions, viewed in the light of all we know, seem very severe, and the writer cannot help thinking that whenever satisfactory results are not obtained, unless analysis shows the steel to be decidedly unsuitable, the cause should be unhesitatingly assigned to the treatment.

The precautions which seem to suggest themselves are: 1, Great attention to all the heatings to avoid the formation of scale and burning out of carbon from the surfaces to be welded, and unless the objections are insuperable the use of a flux, as this would admit of less heating and protect the steel; and 2, that either work should be put on the material after it is below critical temperature (say at low red), or the tubes after cooling rapidly should be rapidly heated to cherry red for a minute or two and allowed to cool naturally in air.

Gas Cylinders and Other Welded Goods.—The same precautions should be observed as described for tubes, and when only a part of the material is heated to welding, so that another part is at blue heat and may suffer accordingly (as described for forging and welding), the reheating of those parts as just referred to should be adopted to remove any harmful effects.

Plates.—The treatment these receive which may affect their properties are usually bending, pressing, or flanging, hot or cold, punching, shearing or piercing and welding.

All these may set up more or less severe strains, resulting from work at too low or too high temperature affecting parts only. Flanging by continued hand ham-

mering, either at a blue heat or cold, is particularly trying to the material.

All these strains may be removed by reheating rapidly to cherry redness for a minute or two and allowing to cool naturally in air. When the makers know that plates thin enough to have much rolling hardness must stand any severe work, if they can finish them hotter, say at a good cherry red (say 800 to 900 degrees C.), and let them cool slowly in masses, they would be able to supply them in a somewhat softer condition.

The effect which the finishing temperature and the amount of work have on the hardness and toughness of a plate and on the tests it will stand are widely understood, and can be largely controlled by regulating them. (See also paragraph on "Tests," Section VI.)

Sheets, Black Plates and Tin Plates.—Much the same applies to these as to thin plates; being thinner, they tend to be finished colder, which, though often done intentionally to give them a better surface, results in greater rolling hardness. Hence for many purposes they are annealed, the treatment generally consisting in packing them in large piles into boxes which are intended to exclude the air from them while they are heated (but which are generally cracked and let in quite enough air to burn out a good deal of the carbon from parts at least of the sheets). A strip of varying width round the edges shows airing by its color. These boxes are heated up slowly, which may take from a few hours to a day, according to size, and then maintained from 8 to 24 hours or more at full red heat and allowed to cool down very slowly, heating and cooling taking altogether from one to three days. This gradual heating and cooling, if carried at all to excess as to temperature or length of time, will undo the good of reheating by promoting the growth of grain,[6] and if too much air gets in, by burning out the carbon, so that in either case the sheets may be more brittle than before.

The more rapidly it is possible to heat the sheets up, and the less the time they are kept hot once they have reached cherry red, the smaller the grain and the tougher they will be.

All sheets that are paired or folded two or more times are liable to get foreign matter, such as scale, coal dust, or ash, &c., between them, which may stick to and become imbedded into the plates, and form streaks of various shapes, sizes or color, or, if they afterward come away, leave the corresponding roughness and indentations on the surfaces.

These streaks, if only small and thin, may be removed by the pickling which usually follows, and the roughness obliterated by subsequent operations, such as cold rolling, tinning or galvanizing.

The foreign matter is always present to a greater or less degree, and it is rarely that slight streaks may not be observed on such sheets; but when they are rolled a little hotter than usual, so that the surfaces are softer, the dirt sticks and is rolled in more easily, the result being wasters. No streaks of this description are ever the fault of the steel maker.

The writer was some years ago afforded the opportunity of investigating this matter thoroughly at several works, and was able to reproduce at will all kinds of typical streaks and indentations, and thus to demonstrate clearly to the complete satisfaction of the principals how they were brought about and obtain their full admission that this was so.

The matter is also referred to later. (See "Faults," Section VI.).

The chief treatment which sheets may have to undergo is for:

Tinning.	Galvanizing.
1. Rolled.	Rolled.
2. Black pickled and swilled.	Annealed (not always for common sheets).
3. Annealed in boxes as described.	Black pickled and swilled.
4. Cold rolled.	
5. Annealed again, but more lightly.	Galvanized in molten zinc at a temperature of 412-500 degrees C.
6. White pickled and swilled.	
7. Tinned.	
Afterward stamped, pressed, &c.	

[6] Stead, "Brittleness in Soft Steel Produced by Annealing," *Journal of the Iron and Steel Institute*, 1898, No. II.

Blisters are described under the head of "Pickling."

Strips being simply narrow thin plates, much the same applies to these as to the latter.

For stamping, shearing, punching or similar purposes they should be very soft. They are used either in the state as rolled or as cold rolled bright strip. This latter, though materially hardened and sometimes rendered brittle by the pickling and subsequent cold rolling it has undergone, cannot be annealed after cold rolling, because this would spoil the smooth bright surface. In either case, that they may be as soft as possible at the outset—if rapid reheating to cherry redness for a minute or two and allowing to cool naturally in air, or an ordinary annealing as for sheets, is not practicable—finish rolling at a good cherry red and allow to cool slowly in large heaps.

Strips for Welding Into Tubes, or for any purpose in which there is further reheating, should receive as little heating and be rolled at as low a temperature as practicable, since they have in all to stand a lot of fire, and rolling hardness in them does not matter, as it is at once removed by the next heating.

Hoops, being simply smaller strips, come under the same category. There is sometimes a tendency, as they are so thin and cool rapidly while rolling, to heat them to a very high initial temperature, and perhaps burn them, causing red shortness. Again, a good deal of importance may attach to the degree of stiffness they possess and to their color, on the one hand (as in baling hoops), while on the other, if they are of 0.2 per cent. to 0.4 per cent. carbon, they may be brittle if rolled at too low a temperature.

A good deal may be done to avoid all the troubles named by rolling at not too high an initial temperature, so as to avoid red shortness, but cooling slowly in heaps to avoid too great hardness.

Wire Rods and Wire.—Though the area of these is relatively small, wire rods are generally rolled so fast, especially in continuous mills, that they finish at a good red heat, and being wound in compact coils, which are often stacked in large heaps, they cool slowly, and are not so hard as might have been expected.

At the same time the rolling hardness is considerable, as can be seen from a comparison of the twisting test on wire as it leaves the rolls, and the same after rapidly reheating to cherry redness and allowing to cool. The hardness is no doubt increased locally wherever the rod touches a cold object, such as a part of the reel, a floor plate, or cold coil, or if put outside in wet weather, and may sometimes amount to brittleness.

High carbon steel is, of course, more affected by all hardening influences than low carbon steel.

It is not often that wire rods are finished hot enough to render them, even with slow cooling, brittle or "rotten" from this cause, but occasionally in the thicker grades, such as guide rods, ⅝ inch in diameter and upward, instances have been met with (*vide* sample 4*a* exhibited by the writer in May, 1898, when reading his paper on "Brittleness in Soft Steel"), though it is more than probable there has also been soaking of the billets before rolling when this occurs.

Wire Rods for Drawing are usually first pickled, swilled, lime washed, and annealed, and then, after every two or more drawings (according to the reduction, the carbon contained, &c.), reannealed lightly. There is no doubt a tendency to draw through as large a number of holes as possible and minimize annealing.

Cold drawing has, of course, a very marked hardening effect, and, if carried a little too far, may easily make the steel brittle.

Wire rods and wire for galvanizing, after pickling, are usually passed through a long red hot furnace at such a rate that they are not scaled, but just dried and heated up to about the melting point of zinc before entering the bath. Zinc melts at 412 degrees C. (which is just above blue heat), and to avoid loss of zinc it must not get too hot, so that the wire, with its pickling hardness perhaps not completely removed, is for a short time, both before, during and after galvanizing, kept at or near blue heat while under tension and vibration.

It is not surprising, therefore, that hardness or brittleness is more frequently met with, especially in guide

rods and large sizes, in galvanized than in ungalvanized goods.

Pickling.—It is pretty well recognized, and there is a good deal of published evidence, that pickling causes hardness and brittleness, sometimes to a very marked extent, which is generally attributed to an alloying of hydrogen with iron, and this is no doubt substantially correct.

The writer has several times heated pieces of pickled wire rod of various ages that were hard in an atmosphere of carbonic acid contained in a glass tube sealed at one end, and obtained, particularly between barely visible red (say 500 degrees C.) and low cherry red heat, to which the heating was continued, an evolution of gas which (beside the carbonic acid gas used), on testing, proved to be hydrogen.

As soon as this gas was liberated the sample became quite soft. The writer has never seen conclusively explained why or under just what conditions the hydrogen is absorbed, whether it is a question of strength of acid, temperature, or length of time, but it is quite certain that pickling does not always have the same effect.

Observations could probably be best made in some works where pickling is a regular operation, and it would be very interesting if some one would take this up.

It is also pretty well recognized that pickling may cause blisters on thin sheets. These pickling blisters are quite distinct from ordinary blow hole blisters, and are usually thickly distributed over the plate, and range from about the size of a pinhead to that of a pea. They never appear until after pickling, and often come up during the annealing which follows it. Such blistered sheets are also brittle.

The writer has sheared such blistered sheets into shreads under water and collected the liberated gas, which consisted essentially of hydrogen, as obtained from the pickled wire rod; whereas blow hole blisters, such as are occasionally met with in the sheets when first rolled, are generally larger (sometimes quite large), occur isolated or in small groups, and consist chiefly of carbonic oxide and nitrogen, no hydrogen.

Pickling blisters, if they only come up after annealing, have lost their hydrogen, it having been expelled by heat and replaced by air. Frequently a small hole is visible in the head of each blister where it has burst and the air entered. As with pickling hardness so with pickling blisters; the writer cannot exactly say what are the conditions under which they are produced. At some works they are recognized as being solely the product of pickling, while at others, with exemplary consistency, the steel maker is blamed for them.

Some years ago, at one of several works where the writer was assured that pickling was solely responsible for them, to prove it about a dozen plates were taken at random from a number of packs (all of which had been pickled in the ordinary course without any blisters appearing), and hung over the side of a pickling vat so that they dipped half way in, and after a short time the lower halves of the plates were all covered with pickling blisters, the line of demarcation being quite sharp. In this case the extra pickling was the immediate cause.

It seems probable that the grains, which in thin sheets are flattened into flakes or laminæ, become separated, perhaps by the action of the acid, and, when sufficiently thin, the film of metal is distended by the hydrogen, either at once or by the heat while annealing.

From experiments conducted by the writer (though he cannot consider them final), it seems strongly probable that blistering is promoted by a higher temperature of the sheets when rolled or by soaking them longer than usual, such treatment tending to burn out the carbon and permit separation of the fiber.

Galvanizing.—Much the same applies to other articles as has been described under the head of galvanizing wire rods. It is pretty generally recognized that it tends to produce brittleness, mainly, no doubt, from the causes mentioned, and possibly also from the brittle nature of the zinc-iron alloy which forms at the junction of the two metals when they are properly united.

All that can be done is to keep the steel as soft as possible up to the stage of pickling as described for wire and heat the goods as hot as possible after pickling (short of oxidizing the surface and preventing the adhesion of the zinc) so as to expel hydrogen and restore softness and avoid all chilling and cool as slowly as possible after leaving the zinc bath.

Cold Drawing or Rolling has been referred to. In large sizes, as the work penetrates the mass still less, the compression and distortion of the surface sets up a state of strain and sometimes minute transverse cracks, predisposing to fracture. The effects of cold hammering, as seen by the miscroscope, have been described by the writer in a former paper,[1] and cold drawn rods show similar effects.

As both the pickling which preceded it and the cold drawing have such hardening effects, it is most desirable that the steel should be in a very soft condition prior to these operations. Therefore, where possible it should be annealed by rapid reheating to cherry redness, as previously described, or by the ordinary methods; or, failing this, finished sufficiently hot, or cooled sufficiently slowly, after rolling to (while avoiding large grain and want of toughness on that score) also avoid rolling hardness.

Rods predisposed to brittleness, either by finishing above critical temperature, and thus leaving the grain too coarse, or by finishing at or near blue heat, are, when subjected to the further hardening and straining effects of pickling and cold drawing, almost certain to become very brittle.

These few examples should suffice to illustrate some of the directions in which to look for causes for unusual behavior, but, of course, the number of possible causes which might bring about a result is very large, though a careful consideration of each particular case should facilitate a correct solution.

Section VI.—Tests Standard Required.

With reference to steels being termed brittle, unweldable or faulty in any other respect, in view of all that we have seen as to the treatment steel gets and how it is affected thereby, it seems only reasonable that there should for all types of manufactured articles be some tests which, when made under clearly defined conditions, should be publicly recognized and accepted as legitimate (as they are for certain requirements, such as boiler plate, ship plate, rails, &c.), and to which any samples under question can be referred as to a standard. At present if a piece of steel fails in any process, or will not stand any test that the user imposes upon it irrespective of any treatment it has received up to then, it is condemned and the maker blamed (and told that it is no good unless it will stand such treatment, ignoring the enormous differences in effects that a slight difference in treatment, such as might easily occur without being known, may have).

For instance, it does not seem reasonable to designate as brittle a narrow piece of strip or plate with the rolling hardness still in it, and, say, 1½ to 2 inches wide, both edges being cold sheared and not trimmed off in any way, because it will not stand bending close double along the line of rolling. A good deal of steel will stand such a test, but when it does it is not necessarily that the quality of the steel itself is exceptionally good, or when it does not that it is inferior, but may be simply that the sum of the treatment it has received has not been too severe. Even two cuts with the same shears do not necessarily set up an equal strain; from the same piece of plate sheared into cotters some may crack, while most stand.

Therefore, when pieces do not stand and the strains or hardness set up by treatment are an unknown quantity, they should be removed before testing, and thus the pieces put on a known basis by heating rapidly to cherry redness for a minute or two, and, according to composition, purpose, &c.,

Allowed to cool slowly in lime, ashes, &c.
Allowed to cool naturally in air.
Chilled in water.

[1] *Journal of the Iron and Steel Institute*, 1899, No. II, "Practical Microscopic Analysis."

Section VI.—Manifestations.

Classified under heads of faults of different types, appearing after treatment by the user, for tracing their probable source.

Type of fault and manifestation.	By whom originated (probably), provided material as sent away of composition within limits specified and free from visible defects.*	Probable cause.	Tests for identifying cause.
UNSOUNDNESS—			
Hollowness	Occasionally (if clean), user	Work at too low temperature, not penetrating mass evenly, and causing "creep" of material, † particularly in forgings‡	Microscope shows abnormally distorted grain, &c. ‡
Lamination	Generally always if inclosed slag or dirt found ..... maker	Segregation and (or) insufficient cropping.	Presence of slaggy matter high in manganese.
Seaminess (when machined)			
Split ends		Rolled from cold sheared bars, some of ends of which have split and not been noticed	Examine ends of unrolled bars left carefully.
Laps	If clean, roller, whether maker or user ..... If dirty, or other signs of unsoundness ... maker	Pipe in ingot imperfectly cropped, or crack not worked out	Eye or microscope can generally discriminate.
SURFACE DEFECTS—			
Cracks	Generally (always if inclosed dirt) .... maker	Cracks, &c., imperfectly rolled up, but closed up enough to escape notice	Eye or microscope shows lapping, and generally scale or dirt.
Scabs			
Spilliness (wire)			
Blisters (sheets)			
Blisters (sheets)	If bright inside, but large and isolated, or in groups ..... maker	Segregation ingot top / Blowholes ingot top — Insufficient cropping	Contain CO and N if formed before annealing.
Blisters (sheets)	If bright inside, but small and thickly distributed, probably user	Improper pickling	Microscope shows normal-sized grains, and soundness before pickling, or in parts other than actual blisters.
		Improper pickling preceded by overheating or soaking.	Microscopic examination shows large grain or bands.
	Occasionally ..... maker	Sponginess, insufficient cropping	Microscope shows unsoundness before pickling, or in parts other than actual blisters.
Streaks	Unless accompanied by lamination at edges of streaks) ..... user	Foreign substances, as coal, coal ash, scale, &c., rolled into surface through getting between rolls and piece, or between pairs of folded sheets. Frequently sticks more if sheets hotter, and hence softer than usual.	If scraped off, sheet underneath sound. Color and simple test shows what it is. Coal (black) burns brown or white; coal ash brown (oxidized); coal ash white (not oxidized). Scale contains 60–70 p. c. iron.
Indentations. Roughness or pitting		Left when foreign substances become detached.	Microscope shows larger grain if heated hotter.‡
DRYNESS	Generally ..... maker	Red-shortness	Analysis shows S and Mn. and hence if these are at fault.
		Segregated parts in center (least cohesion) not all cropped off	Excess of impurities on insides.
Opening at ends	Occasionally ..... user	Overheating, sticking in rolls, &c	Color and scale shows this, and if composition quite suitable for purpose, overheating probable cause.
RED-SHORTNESS	Frequently (to some extent§) ..... user	Overheated or "soaked" too long	Generally accompanied by thick scale. Microscope shows large grain or bands outside, good normal grain inside if piece thick enough.
Won't weld well	Frequently (to some extent§) ..... user	Want of flux	Make welding test with flux.
		Unsuitable quality specified	Analysis in conjunction with purpose shows this.
Rough ("saw") edges	Occasionally ..... maker if all over, piece or user	Quality has not sufficient margin of "body"	Analysis in conjunction with purpose shows this.
Won't forge well	If only part, say one corner ..... user	Burnt	Generally accompanied by thick scale. Microscope‡ shows large grain or bands outside, good normal grain inside if piece thick enough.
BRITTLENESS—		Either one or more of the following in greater or less degree:	
Breaks off short	Generally (unless composition seriously at fault) ..... user	If coarse grain — Finished too hot or "soaked" too long: Furnace too hot; Rolled hot to spare machinery; Rolled very quickly; Large sections; Delay in mill—Steel left in furnace, or over night. Over-annealed. — Cooled very slowly in large heaps, &c.	Fracture generally shows coarse grain. Microscope shows larger grain than normal for that section or structureless bands, especially at outside of piece.‡
Cracks in punching, stamping or shearing			
HARDNESS—			
Won't bend enough	Generally (unless composition seriously at fault) ..... user	If fine grain — Finished too cold or chilled while at blue heat: First piece; "Stalling" of piece or other delay; Thin sections; Cold floor, &c; Spread too much; Rain or intentional watering. Omitting annealing where required. — Cooled rapidly	Microscope shows abnormally distorted grain, &c.‡
Won't twist enough (wire)	Generally (unless composition seriously at fault) ..... user		In samples rendered brittle by any of causes named, heating for minute or two to cherry red and chilling in water if C. not over 0.10 per cent., or cooling in air if above this, restores toughness, unless sample has been thoroughly spoiled. Microscopic examination also shows grains restored normal.‡
Punches and shears too hard	Generally (unless composition seriously at fault) ..... user		
Tensile test too hard	Generally (unless composition seriously at fault) ..... user	Exceptionally severe pickling; cold drawing, rolling or hammering; or galvanizing.	
OVER SOFTNESS—			
"Lugging" (Won't cut crisp and turn smooth)	Generally ..... user	Tools too blunt or cut too heavy / Unsuitable quality specified — Before asking for harder steel, make sure it will not do harm in other way. Try sharper tools or lighter cut first	Comparative tests, using same tool or drill with pieces considered right, will show whether steel is soft or tools blunt. Microscope may show larger grain.‡
Tests too soft	Generally ..... user	Finished rather hotter or cooled slower than usual, sufficiently to make steel softer	

Excepting most forms of unsoundness, it is probable that faults which affect only a small proportion of the steel, and not a whole cast, are not due to the maker, but to the user, for the composition, if wrong, is so in a whole blow, as there is no material variation between one part and another of the same blow, except that occurring from the outside inward, due to segregation, while any variation in the heat and treatment given by maker does not count, as it is obliterated on reheating by user. Many faults are, however, due to a combination of causes for which both maker and user are in varying degrees responsible. If (1) The steel is normally taxed almost to the limit of its endurance by the processes it is made to go through; (2) The maker has not been clearly informed as to the purpose for which it is intended or treatment it will receive, particularly as to soundness when worked into machined articles, the slightest speck or seaminess in which will condemn them: (3) The characteristics of each make of steel are not studied by the user, but all worked indiscriminately: the maker's responsibility should be less.

* Except in the case of ingots or large blooms, slight surface cracks if chipped deeply.

† Dixon Brunton, "Wire and Wire Drawing," *Journal of the West of Scotland Institute*, No. 4, January, 1900, p. 119. Also "Mannesmann" process is an example.

‡ Ridsdale, "Practical Microscopic Analysis," *Journal of the Iron and Steel Institute*, 1899, No. II.

§ Maker for his own sake will keep S and other impurities low, as, if seriously at fault, heavy drafts of ingots at once reveal red-shortness, will not roll down clean, so gets thrown out as defective and does not leave works.

Again, any steel which will conform to the bend tests specified by Lloyd's for boiler plate or ship plate should surely not be considered brittle.

Also a standard system for allocating any trouble that arises is desirable, and for defining the lines on which it shall be argued.[8] In the table of faults of various types, Section VI, are briefly indicated a few tests—mechanical, microscopical, thermal and chemical—which might serve to trace them to their probable source and thus enable the trouble to be stopped in future. They are, of course, only quite general, as each particular case will probably suggest its own tests.

It may be asked, What steps should any one take who is wishful to always give the best treatment in order to train the men who do the work? This is not a question of a pyrometer or of drawing up lists of proper temperatures, either in degrees Centigrade or in terms of color. Even if they can measure these and know when they have got them, this is not enough. It all comes back to this: That since no outsider knows any one's exact conditions or chief troubles the only thing is for each one to study these and thus decide in what direction to make alterations—possibly what has been said may be some help—then try pieces under different conditions, finishing hotter and colder, cooling more or less rapidly, &c.

No doubt many matters will have been noted on which further information is desirable, and among these the following occur to the writer:

1. Condition of absorption of hydrogen and production of pickling brittleness and blisters at will, whether due to strength of acid, length of time, galvanic action, &c.

2. Whether galvanizing hardness is due to anything other than the blue heat treatment.

3. How far pickled articles can be heated (to soften them) without interfering with the zinc taking.

4. Means of annealing cold rolled goods plain and bright without destroying their bloom, color or brightness.

5. *a*. Authenticated instances of (soft) steel which was known, in the first place, to have neither had large grain nor been in a state of strain, and known to be quite tough, which had become brittle and crystalline by vibration or fatigue only.

b. Means of rendering tough fine grained steel, free from state of strain, coarse grained and brittle, at will, by vibration or fatigue under known conditions.

6. Relative effect of blue heat working on steel of different carbon contents. (It is difficult on a small experimental scale to insure a uniform degree of blue heat work.)

Power Development at Niagara Falls.

When, on October 4, 1890, ground was broken at Niagara Falls, N. Y., for the tunnel power development of the Niagara Falls Power Company, and the plans for the development were gradually unfolded to public view, it was generally recognized that it was destined to be a marvelous installation that would be erected to place the force of the river within the reach of man. The eleven years that have elapsed have served to meet all expectations in this respect, and it has been found that the 5000 horse-power turbines and the 5000 horse-power generators have answered the expectations anticipated of them. When these machines were built they were the peers of all that man had ever created. They denoted a remarkable progress, and from the time they were installed to the present day they have attracted the attention of scientists of the world.

Now a new development is projected for the Canadian side at Niagara, and the experience of years and the advancement in electrical science are to be drawn upon to make the proposed new Canadian plant a twentieth century marvel. Acting upon the advice of Mr. Buck, electrical director, the Canadian Niagara Power Company have adopted plans for generators of 10,000 horse-power capacity each, and the General Electric and Westinghouse companies are figuring on them. Thus each of these generators will have double the capacity of the generators now in use in the station of the Niagara Falls Power Company. Further facts about these wonderful machines are not at this time available. The tunnel work on the Canadian side is going forward rapidly, and the contract for the new wheel pit will be awarded, in all likelihood, within the next fortnight.

That there is continuous progress in the electrical line is evident from the fact that the new generators the General Electric Company are now building for the Niagara Falls Power Company are guaranteed not to short circuit. This is a feature of vast importance, for the short circuiting of the 5000 horse-power dynamos is the greatest source of danger in the station, and only recently one of the big dynamos was burned in this way.

William B. Rankine, vice-president of the Niagara Falls Power Company, and other officials of the same company, have recently returned from a five weeks' trip to California, where, naturally, they carefully inspected the famous power transmission lines. Mr. Rankine expressed himself as greatly pleased with what he had seen in the far West and that the power transmission lines were very good. One transmission is about 160 miles, but is to be carried 200 miles. The voltage at present is 60,000, but the pressure on the lines is not so great as on the Niagara-Buffalo line.

Considering the California transmission lines inspected, it is interesting to observe that were the Niagara transmission line stretched out 200 miles it would go beyond Cleveland, Ohio, on the one side and down close to Utica in the interior of New York State. In Pennsylvania even Pittsburgh in one direction and Lock Haven in another might be touched, while in Northern New York Watertown might feel the beneficial effects. California is the possessor of a dry atmosphere and there is a lack of sleet storms, but Niagara has the power and surrounding the Falls there is a marvelous market to which the transmission lines may some day carry the product of the mammoth generators to a greater extent than to-day.

The No. 7 Becker-Brainard Vertical Milling Machine.

This machine has been designed by the Becker-Brainard Milling Machine Company, Jamaica Plain, Mass., in order to meet repeated inquiries for an extra heavy vertical spindle miller of large capacities, built on the lines of the No. 6 machine, which was described in *The Iron Age* of October 24. As an indication of the general utility of this machine, it is interesting to note that with the exception of screw machine work, shafting and spindle work, everything which would otherwise be done on the lathe and planer in the finishing of smaller sizes of the Becker-Brainard horizontal milling machines can be done on this.

The knee is supported upon two elevating screws, thus giving it the maximum of stability. The standard is strongly bolted to a heavy base plate casting, which may be set in a recess built in the foundation, so as to bring the operating levers, hand wheels, &c., within easy reach of the workman. Though twice the weight of the No. 6 miller, it is fully as easy and economical to manipulate when used on the lighter class of work. The specifications given below cover the general proportions of the standard machine, when provided with feed of 60 inches. The company can also furnish the same machine with table feed of 72 and 84 inches. Specifications are as follows:

Size of platen inside oil pocket, 58 x 26 inches; length of saddle, 72½ inches; longitudinal feed, automatic, 60 inches; cross feed, automatic, with stop, 30 inches; vertical feed, spindle, automatic, 15 inches; feed per revolution of cutter, 0.0035 to 0.565 inch; range of spindle speeds, 3.5 to 360 inches; greatest distance between spindle and platen, 26½ inches; greatest distance between spindle and rotary platen, 20 inches; distance between center of spindle and neck, 31 inches; vertical ad-

[8] A line of argument sometimes met with when trouble has occurred, and yet chemical and mechanical tests all seem to show conclusively that it has arisen through something exceptional in the working-up process, is "Setting aside all technical questions, the fact remains," &c. But technical questions ought not to be set aside; if they are, the matter is not bottomed and no progress is made.

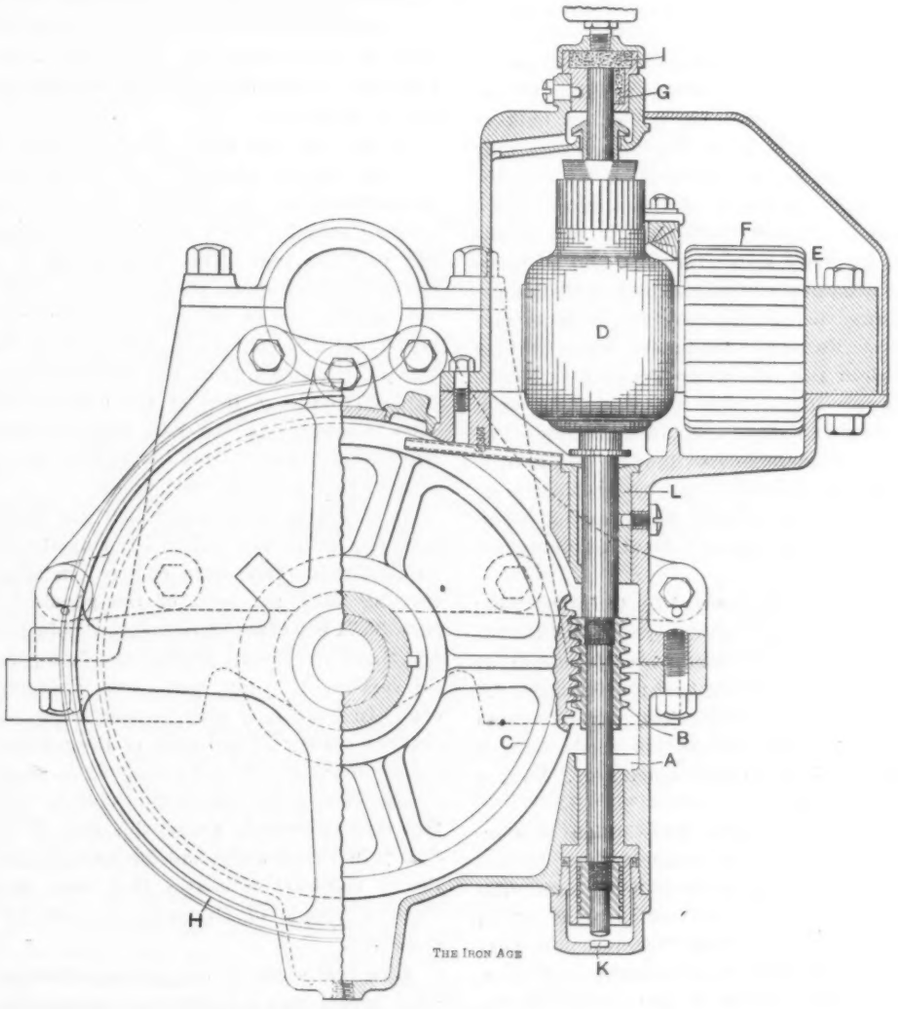
justment of knee, 15 inches; diameter of spindle, main bearing, 4½ inches; diameter of spindle driver (back geared 8 to 1), 28 inches; diameter of rotary table, inside oil pockets, 32 inches; outside, 36 inches.

The Bassett Method of Taking Up End Thrust in Worm Gearing.

From letters patent issued to N. C. Bassett of Lynn, Mass., and assigned to the General Electric Company, we make the following abstract of an improvement in worm gearing for transmitting power from motors. The great friction, due to end thrust, is avoided by giving the worm shaft a thrust in a direction opposite to that imposed by the load and sufficient, when the load is normal, to counterbalance the end thrust. In this construction the worm shaft engages only the worm wheel and the friction due to lateral thrust is done away with. It is explained that this plan is of particular advantage in connection with worm gearing driven by electric motors, in which case the armature of the motor may be mounted on the worm shaft and by reason of its weight act as a counterbalance to the normal load. In addition to this the direction of motion transmitted is such that the effort of the load is to raise the worm shaft and lift it out of mechanical contact with its lower bearing and hold it floating, as it were, while the worm transmits motion to the wheel it engages. In such a case the field magnet of the motor acts in the capacity of a frictionless spring or cushion, which assists the weight of the parts in balancing the load, since any tendency of the load to raise the worm shaft tends to deflect the armature into an unsymmetrical position with relation to its field magnet, and the latter resists such a tendency.

The design, therefore, comprises a worm gearing in which the worm shaft is given a bias to counterbalance the normal load in order to prevent the losses due to end thrust. It comprises also a system of gearing in which the worm shaft is mounted vertically and given a bias by weighting or otherwise to counterbalance the load.

The construction will be fully understood from the accompanying drawing, in which B is the worm shaft, arranged in a vertical position, and carrying the armature D. The shaft has an upper bearing, G, and lower step bearing K. With this shaft engages the worm wheel H. The weight of the armature and worm shaft may be so designed as to just counterbalance the lifting effect of a normal load on the driven machine. Any excess of load tending to raise the shaft in the case of an electric motor driven outfit would lift the armature relatively to its field of force, and such an effort would be strongly resisted by the magnetic pull between the armature core and the field magnet. Thus when the gearing is in operation the worm floats, as it were, in its bearings, and the efficiency of power transmission between the motor and the work is greatly increased.



THE BASSETT METHOD OF TAKING UP END THRUST IN WORM GEARING.

Exaggerated statements have been published regarding purchases of furnace properties in Lebanon County, Pa., by the Lackawanna Iron & Steel Company. The only basis for these reports is found in the fact that the company recently purchased W. C. Freeman's interest in the Cornwall Iron Company. This purchase does not carry with it any ore property.

L. B. Smyser and F. S. Burnett, formerly with the United States Long Distance Automobile Company of Jersey City, have opened offices at 136 Liberty street, New York, as mechanical engineers.

The Iron Age

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Commerce and Industries of Germany in 1900.

In glancing over the report by the United States Consul-General at Berlin on the commerce and industries of Germany in the year 1900, one finds that the United States leads all other nations in the matter of imports into Germany. It appears that we supplied the Fatherland with 16.9 per cent. of the entire bulk of goods brought into that country, while Germany only sent over to us a matter of 9.3 per cent. of her exports. This balance of trade in favor of the United States, when stated in figures, amounted to $138,301,800. While this is a very satisfactory state of affairs, and while no doubt as to the accuracy of these export statistics exists, it must always be remembered that a large percentage of all American products landed upon German soil (and counted in the percentage figure give above) simply pass through that country en route to Russia, Austria-Hungary, Switzerland and Scandinavia. The amount of American merchandise landed in the free port of Hamburg, destined for Russia, is steadily increasing, and it seems that there is no means of ascertaining just how much of our products Germany actually consumed.

In 1900 the total imports received by Germany were valued at $1,438,234,000, and the exports at $1,131,214,000. Among the imports raw cotton stood highest at 5.3 per cent.; raw wool, 4.3 per cent.; machinery, 1.6 per cent., and coal, 2.2 per cent. The export figures for similar commodities are: For cotton goods, 5.2 per cent.; woolen goods, 5 per cent.; machinery, 4.8 per cent., and coal, 4.8 per cent.

A survey of the geographical distribution of Germany's foreign trade for 1900 is interesting. In imports the United States leads with 16.9 per cent. (the reader bearing in mind the qualification with which this figure must be regarded), Great Britain comes next with 13.9 per cent.; Russia, 11.9 per cent.; Austria-Hungary, 12 per cent., and France, 2 per cent. In exports, Great Britain takes 19.2 per cent.; Austria-Hungary, 10.7 per cent.; the United States, 9.3 per cent.; Russia, 6.9 per cent., and France, 5.9 per cent. From these figures it appears that this country maintains a commanding lead, as the one having the largest and most valuable direct export trade to Germany, with third place in imports.

When we examine the statistics covering imports to Germany from the United States from January 1 to June 30, 1901, given in metric tons, and compare them with the figures for the same period in 1900, we find that out of a list of 15 articles, wheat, rye, oats, corn, petroleum and products, pig iron and cotton seed oil, all show an increase, while raw cotton, cotton waste, barley, raw tobacco and stems, hides and skins, lumber, timber and staves, meats and copper show a decrease. The falling off in American copper is significant in that it represents declining activity among manufacturers of electrical machinery, and temporary suspension of many new lighting, power, telephone and other enterprises which are large consumers of copper. The increase in American wheat and corn is likely to be augmented during the last half of this year by the scanty harvests of the past summer throughout Eastern Germany.

In shipbuilding Germany still shows unimpaired activity. The development of steel ship construction since 1890 has been phenomenal. The contest for speed supremacy in transatlantic passenger and mail traffic seems to have been abandoned by other maritime nations to Germany and the rivalry now exists between the two leading lines, the Hamburg-American and the North German Lloyd. In 1898, of the 21 steamships of 10,000 tons or over then afloat, Germany owned ten; Great Britain, six; the United States, four, and Holland, one. This year there are 61 of these leviathans in commission, of which 26 fly the British flag, 24 belong to Germany, six to the United States, three to Holland and two to France.

During the first eight months of 1900 the activity of German mining districts was unprecedented, so that notwithstanding the reaction which began during the autumn months, the general record surpassed that of any previous year. The value of pig iron produced in Germany rose from $51,579,400 in 1893 to $130,685,800 in 1900, or an increase of 154 per cent. in seven years. In this connection reference to the increase in pig iron imported from the United States in the first half of 1901 over that of the corresponding period of 1900 is interesting. In 1901 (first six months) we forwarded 9309 metric tons of pig iron, being an increase of 3522 tons over the 1900 period.

It is generally conceded that the high tide of German prosperity was reached during the spring of 1900. At that time there were engaged in mines and manufactures 39.12 per cent. of the population; in agriculture, 35.74 per cent.; in commerce, 11.52 per cent.; in the army and the liberal professions, 5.48 per cent.; domestic service, 1.71 per cent., and unoccupied, 6.43 per cent. In France, it may be mentioned, mining and industries occupy 27 per cent. of the population, while in the United States 24 per cent. only is so employed.

The turn of the tide in Germany is evidenced by the fact that at an early period this year 15 branches of industry in Berlin alone had discharged 22,629 men. The Berlin *Tageblatt* estimates that one-fourth of all the working people of Germany are idle or insufficiently employed.

A careful study of the present situation in Germany must reveal two influences of momentous importance. These are the overshadowing competition of the United States and the impending tariff legislation in Germany. Recent developments have shown that iron, steel and a number of other important articles can be produced in the United States in practically unlimited quantities at prices with which Germany cannot hope to compete. Every step of American progress and development is, however, watched and studied with the keenest interest. The trade balance of the United States at the close of the fiscal year 1901 produced a profound impression in Germany. It seemed to confirm the predictions of a certain class of economic writers, who since 1898 have been urging the combination of European nations for mutual protection against the United States. It has been pointed out, on the other hand, that the formation of a Continental customs union for such a purpose is really impracticable, owing to international and racial rivalries and jealousies, and that it only remains for the different European States, when negotiating commercial treaties between themselves, to differentiate against this country by excluding American imports

from the special rates granted to each other, and, further, to agree upon measures to be adopted by all European States in case of a tariff war between any one of them and the American republic.

The draft of the proposed new German statute, published last July, roughly doubles the import duties on cereals, meats and other food products, and, while generally favoring raw materials, increases the duties on practically all manufactured merchandise which is, or can be, made in Germany. This measure will probably be revised before being introduced into the Reichstag during the coming winter. If enacted, it will not go into force until the beginning of 1904, for the reason that several of the commercial treaties concluded between Germany and other nations will not expire until the close of 1903.

Conventions and mass meetings are being held in order to consolidate public opinion against an enactment which would increase the price of food. Great industrial associations, the league of manufacturers and their employees, for example, have formed a solid front against the proposed schedule of duties on food, while the advocates of revision are equally numerous and determined and ably led. The associated manufacturers of Germany have formally notified the Government that their representatives in the Reichstag will support no tariff schedule which maintains the proposed minimum rates of duty on cereals. The agrarian members will oppose any tariff bill which does not fix definitely the minimum rates to which the duties on cereals may be reduced by treaties of reciprocity. There is a party in Germany which, following the lead of Professon von Waltershausen, is opposed to the policy of binding Germany by any long term treaty with a country in which economic conditions change so quickly and powerfully as in the United States.

It may, however, be reasonably hoped that the plain common sense of the majority of the nonagricultural people can be trusted to favor a policy of intelligent reciprocity, friendly foreign relations and commercial peace. From 1893 to 1900, those golden years of German prosperity and progress have no doubt disposed a majority of the people toward a policy of commercial treaties and a frank recognition of the interdependence of nations, which has been brought about by higher civilization and modern improvements in communication and transportation. The grumblings of dissent in the Russian press against the proposed new German tariff, and the open threat of a tariff war by Hungary if its enactment is persisted in, have produced a painful impression in Germany. Recent executive utterances in the United States favoring a policy of reciprocal commerce have been welcomed as the keynote to which the best statesmanship of Europe will gladly respond.

The World's Wheat Crop.

From the standpoint of the world at large wheat stands pre-eminent among the crops grown. There is scarcely a nation which is not solicitous concerning the outcome of the harvest, not only within its own boundaries, but throughout the world, because the result in one or more important countries has a direct or indirect bearing upon the welfare of the whole, be it a question of quantity or of price.

Wheat is the one food which contains all the elements of, and in about the same proportion as they exist in, the human body, hence the general heavy consumption of wheat in preference to other grain and the wide distribution of the growth of this cereal. There is scarcely a country, great or small, that does not put forth an effort to raise wheat in greater or less amount, but the great majority of the nations consume more than they raise—that is, they import either wheat or flour, being dependent upon the export countries for a considerable portion of their food.

Of course other grain, especially rye and corn, in a measure compensates for a deficiency in the wheat supply, when its exists, but these are only modifying elements, and sure to accentuate the importance of and preference given to wheat.

The countries which are apt to grow a surplus of wheat are Russia in Europe, Austria, India, Australia, Argentina and the United States. Russia, India and the United States are by far the most important. Other countries are of minor consideration as exporting factors. France, Germany, Italy and Spain raise considerable, especially France, but domestic consumption is large in proportion. Argentina exercises an influence upon the situation out of all proportion to its total crop, due largely to the necessity for its rapid disposal and coming, as it does, when other crops are partially marketed.

The United States furnishes about one-fourth of all the wheat raised, and may be considered, under ordinary circumstances, to hold the key to the situation, but there are so many contingencies that it is no easy matter to control the markets or, at times, even to influence the trend of prices.

From an export standpoint wheat is second to cotton in value as a factor in the international trade of the United States, and among domestic crops it is generally exceeded in value by corn and hay, and occasionally by cotton. But because of the necessities of the world our wheat capacity gives us more prestige, possibly, than any other one crop. This year especially, with an enormous decrease in corn and a short oat crop in the United States, together with a deficient rye crop abroad, the wheat crop is of the greatest importance, being next to the largest yield ever harvested in the United States. And this at a time when nearly all European countries show a deficiency as compared with last year, and in some cases below the average for the past five years.

An average of the most reliable estimates of the world's crop for this year, in round numbers, is 2,700,000,000 bushels, compared with an average estimated production of about 2,560,000,000 bushels last year. The consumptive requirements of the world this year are estimated at 2,697,000,000 bushels, within 3,000,000 bushels of the estimated production. These figures are very close—that is, consumption and yield. Indeed, since the estimates were made the Argentina crop has been reported much reduced, which will bring the estimated consumption and production much closer. From this it would seem that the world's production might fall below the consumptive requirements and the world's reserve stock, of necessity, be again drawn upon. Last year the world's reserves were drawn upon to the extent of 40,000,000 bushels, and the world's consumption is estimated to increase about 24,000,000 bushels annually.

The heavy shortage of the German crop this year was long since admitted, probably over 50,000,000 bushels, but there is still much controversy in France over the deficiency which that country must cover by importations, largely from this country; estimates vary widely. The European Russian crop, too, is short, so that the export surplus of that country will be, or rather is, considerably reduced, one reliable estimate making

the decrease 32,000,000 bushels, as compared with last year.

According to Broomhall the European crop this year will amount to 1,396,000,000 bushels, as compared with 1,484,560,000 bushels last year. The total American crop, including United States, Canada, Mexico, Argentina, Chile and Uruguay, is placed at 905,600,000 bushels, against 745,600,000 bushels in 1900. Asia has harvested 307,200,000 bushels, which is 3,200,000 bushels less than last year. Africa has produced 42,400,000 bushels, which is 5,600,000 bushels more than was raised in 1900, and some of this will doubtless be shipped to France. The Australasian yield is about 46,800,000 bushels, which is 11,600,000 bushels less than last year.

It is estimated that Europe will need at least 280,000,000 bushels from the United States this season, which is about 50,000,000 bushels less probably than will be available for export. Up to and including November 14 there had been shipped abroad over 117,182,652 bushels, which is almost twice as much as had been exported up to the corresponding date last year.

The Department of Agriculture's figures indicate a crop for the United States this year somewhat less than 650,000,000 bushels, but commercial estimates range from 50,000,000 to 75,000,000 bushels more. Taking the official figures as most reliable, and adding 50,000,000 bushels carried over from last year, we have a supply of 700,000,000 bushels to meet home and foreign requirements. Domestic consumption this year will probably be considerably larger than in 1900, because of the heavy shortage in the corn crop and the feeding of wheat to live stock; it is estimated that upward of 50,000,000 bushels will be so utilized this year, making the total domestic consumption 400,000,000 bushels. Besides this, about 65,000,000 to 70,000,000 bushels must be deducted—reserved for seeding—leaving about 230,000,000 bushels available for export. In other words, there is yet held in this country about 110,000,000 bushels, which may be utilized to satisfy the deficiency of European harvests.

If commercial estimates of the United States crop should prove more nearly correct than the Government figures indicate the exportable surplus would be about equal to the estimated European requirements—280,000,000 bushels from the United States. As it is, the assumption seems to be that the Government figures are reliable, and upon this basis the market prices have fluctuated, tending upward in harmony with these facts.

The Northwestern Railroad Consolidation.

The transfer to the Northern Securities Company of control of the properties over which the strongest interests of Wall street have been at loggerheads ever since the scramble of last spring for the control of Northern Pacific, ends a menace to the *entente cordiale* of the cliques which has for months threatened to wreck the national prosperity by precipitating a panic if no other way was offered of composing their differences. With this phase of the matter the public has no further concern than with any other form of quarrel which threatens the public peace and, if permitted to take shape, may result in damage to interests not immediately or directly involved. Not a dollar has been added to the national wealth by the transaction. It represents merely the merging of securities and an exchange of one kind of stock for another. Perhaps the most important result of interest to the readers of this journal is that it has postponed without date, and perhaps averted altogether, a threatened raid upon United States Steel stocks by those anxious to coerce the Morgan interest into the surrender of such advantage as was gained in the speculative scramble before mentioned. In many respects this would have been a calamity. The United States Steel Corporation will probably have problems of their own to solve within the next few years, and their present usefulness could not but be seriously impaired by a speculative attack planned to injure those who are still in large degree responsible for their safe conduct. That this calamity has been averted and the restless energies of the great operators of the stock market turned rather in the direction of harmony than of profitless reprisals is a cause for congratulation. How sensitive the existing conditions which make for prosperity really are is a question no one can answer definitely. Confidence at the moment seems to be a very hardy plant, but whether an exceptional frost would be needed to shrivel it and cause it to shed its blossoms is a question we should prefer to see discussed as an abstract problem rather than as a record of irrevocable happenings.

There is reason to believe, however, that the conflict of last May between the warring interests representing the two transcontinental lines which were competing for the control of properties essential to their welfare was not wholly a public misfortune. It had its advantages, and these were apparent a few months later. Had nothing occurred to check the momentum which was carrying the country headlong to conditions from which the only opportunity for stopping would have been through the shock of derailment, the assassination of President McKinley would have set in motion forces of destruction which no nerve or sagacity on the part of the business interests of our leading citizens could have held in check. As it was, that calamitous event found the business conditions such that nothing like panic or paralysis resulted. The country passed through the throes of the tragedy without shock or grave anxiety, and witnessed a change of administration with gratitude for the wisdom and prudence which had guided it for four years, and hope for the strenuous loyalty of the remarkable young man upon whom had devolved the unexpected responsibilities of the executive function. It is scarcely probable that had the momentum of April been continued without check until September this would have been true. No gratitude is due the speculative cliques of Wall street that their reckless scramble for advantage was overruled for good; but that it was will be recognized by all who have studied the situation carefully and pondered on the sequence of cause and effect, of which the history of the past half year has given such striking illustration.

It is also worth noting that as long as the differences and rivalries erected into bitter feuds by the struggle of May for the control of certain railroad properties remained unsettled and unadjusted the causes were ready at hand for such a clash of interests as might, and probably would, have precipitated a panic in the financial markets on very slight provocation. This "little rift within the lute" has now been closed, permanently it is to be hoped, and the strong influences of the money market are now allied by a common interest in the defense of the national prosperity against all causes threatening it. This removes the most anxious feature of the monetary situation and gives better reason than we have had for some time to regard as stable the foundation of the general business prosperity, which even a shortage of probably 700,000,000 bushels in the grain harvesting of the year has not disturbed.

As to the economic results of the consolidation of interests in transportation which the formation of the Northern Securities Company has effected, it is perhaps too soon to speak. No doubt it will revive the discussion of the dangers to be apprehended from railway combinations and of the necessity for Federal regulation of interstate transportation to protect the interests affected by the concentration of control through the elimination of competition. Very likely it will stimulate State legislatures to enact statutes more or less unwise, to accomplish impossible and generally undesirable results, and give a great fillip to what has been known under the generic name of granger legislation. Meanwhile will arise a clamor for Government ownership of railroads. As the net result we shall find cause for surprise if within a very few years we do not find the interstate railroads appealing to the Federal Government for protection, and pleading for nationalization under any plan which Congress may deem of public advantage. This would appear to be inevitable, and in the judgment of many experts in transportation it is already desirable. It would seem to be the natural and logical outcome of the blundering and tentative efforts at regulation which for so many years have been made under the Interstate Commerce law. The essential principle of that law is that railroads shall maintain uniform rates and treat all shippers alike. How this principle of law has been respected, and how enforced, we have had opportunity to see in the choice of alternatives—secret arrangements between roads, of which the Interstate Commerce Commission could not take cognizance, or agreements through unity of ownership. In the continental scope of transportation interests State control has been outgrown. The limitations of legislative authority are too sharply defined to permit of its advantageous exercise for the protection of the larger interests of the shippers of freights, and the constitutional right of Congress to exercise control over commerce between States has been employed in so tentative a way that very little benefit to any one has resulted—unless stimulating the movement in the direction of community of ownership can be so regarded. Everything considered, we do not think we place our prophetic reputation at risk when we express the belief that the time is not far distant when the railroads forming parts of interstate systems will ask Congress to assume such control of contracts and rates as the interests of the country may demand, as much for their own protection as for the protection of the public. This will come about partly as the result of the desire of great consolidations to put themselves under Federal protection against State interference and partly through the competition of rival systems between which satisfactory agreements are impossible. This would be a logical development of the Federal scheme of legislation in matters touching interests which have outgrown local control and nationalized themselves as the result of physical growth and expansion of purpose. It does not necessarily, nor even probably, lead to Government ownership or operation.

Financial Legislation.

The law of March 14, 1900, resulted in a considerable increase of national banks, but its effect in extending the circulation was mainly limited to the additional circulation banks were permitted to take out on a given deposit of bonds. Most of the new banks were small, a great part of them were only nominally new, being State or private banks that changed to the national system, and the amount of circulation they took out was very much less than the law allowed them. The banks, of course, generally increased their circulation from 90 to 100 per cent. of the face of the bonds they deposited, but they showed little disposition to increase the amount of the deposits, so that nearly all the effect of the legislation referred to has already been felt.

As the returns on Government bonds decrease the profit of taking out circulation decreases, and the only means the Secretary has of preventing an injurious accumulation of idle funds in the Treasury is to buy bonds, which reduces the supply, and must in the end advance the price and reduce the income to the bank. Therefore the relief afforded by the gold standard law, in its provisions dealing with the currency, was only temporary, and the time cannot be far distant when there will be a pressing need of a further increase of the currency. The circulation now is small compared with the amount of banking capital, and small compared with the volume of business, and it possesses only a trace of elasticity, the disposition to expand and, not less, to contract, according to the varying requirements of business from season to season as well as from year to year.

Washington dispatches say confidently that Secretary Gage will press this matter upon the attention of Congress in his forthcoming report, but without indicating what legislation there ought to be. Congress is probably more likely to pay attention to a bill drawn by one of its committees than to a bill prepared by the Secretary. The disadvantages which the Secretary will urge Congress to remove are inseparable from a bond security for the circulating notes, and while there is room for considerable difference of opinion as to the details, there seems to be nothing to substitute for bond security except the aggregate assets of the bank, and the safety of such a currency has been demonstrated by experience, and is supported by statistical studies of national banks that have failed.

It is understood also that there will be a strong effort this winter to complete the legislation establishing the gold standard by removing some features of the law of March 14, 1900, which were concessions to the advocates of silver, or to offset them by specific provisions. It is agreed by all that the present law is sufficient in the hands of its friends, but even if silverism is politically dead, it is not inconceivable that at some time some theories of the bimetallists should be tried. A provision that all kinds of money, including silver dollars, shall be redeemed in gold would make it impossible to entertain any further doubt about what the standard of value of United States currency was.

Baltimore & Ohio Railroad Orders New Equipment.—The Baltimore & Ohio Railroad will place orders, or has already done so, for the following equipment, for delivery in 1902: Thirty-eight consolidated locomotives, 10 six-wheel shifters, 2 four-wheel shifters, 25 passenger coaches, 11 baggage cars, 1 combination baggage and coach, 1 combined mail and baggage car, 1300 50,000 pounds capacity box cars, 4000 100,000 pounds capacity steel hoppers and 700 flat cars, a total of 50 locomotives, 38 passenger cars and 6000 freight cars. The cost will approximate $7,000,000. The rail order for 1902 is as follows: Cambria Steel Company, 10,000 tons of 85-pound; Maryland Steel Company, 11,000 tons of 100-pound and 4000 tons of 85-pound; Carnegie Steel Company, 30,000 tons of 85-pound, a total of 55,000 tons.

The men employed in the Monongahela Works of the American Tin Plate Company, on the South Side, Pittsburgh, are still annoyed a good deal by the strikers, and recently it was found necessary to ask for additional police protection for the men.

PERSONAL.

H. L. Patteson has been appointed purchasing agent of the Crocker-Wheeler Company, Ampere, N. J.

Prof. Henry M. Howe of the School of Mines, Columbia University, New York, has been elected an honorary member of the Russian Technical Society, St. Petersburg.

Henry P. Bope, sales manager of the Carnegie Steel Company, at Pittsburgh, has been elected commander of the Boys' Brigade of America, and the headquarters of this organization will be removed from Chicago to Pittsburgh.

Frank J. Hearne, president of the National Tube Company, Pittsburgh, recently won suits for about $50,000 against various insurance companies. Mr. Hearne's fine residence in the East End, Pittsburgh, was burned about a year ago and the companies refused to pay the insurance.

A. Campignon, Ch. Dunes and S. Campignon of Paris, France, experts on machinery, are in Cleveland visiting machine shops and studying American methods. They have just completed a trip through Canadian manufacturing establishments and will spend some time in the United States.

William Harvey, who recently succeeded J. D. Culbertson as secretary of the Riverside plant of the National Tube Company at Wheeling, W. Va., has tendered his resignation, to take effect December 1. Mr. Harvey entered the employ of Dewey, Vance & Co. in 1866, has completed 35 years with the firm and their successors, and now desires to retire.

Henry C. Frick of Pittsburgh has given Major Louis T. Brown, superintendent of the Upper and Lower Union mills of the Carnegie Steel Company, in that city, a gold watch and fob as a token of his appreciation of the speed and promptness with which the structural material for the Frick Building in Pittsburgh was supplied. Most of the material for this structure was rolled at the Upper and Lower Union mills and it was gotten out in remarkably quick time. The watch is one of the finest made, a representation of the Frick Building being engraved in miniature on the inside of the case.

R. S. McDonald, formerly connected with the Pittsburgh Coal Company, has been appointed manager of the Bureau of Mining which the United States Steel Corporation have established in Pittsburgh. Elmer Hough of Homestead has been appointed his assistant. The new bureau will have charge of the surveying and purchasing of coal and coking properties.

It is understood that W. K. Bixby, vice-chairman of the board of directors of the American Car & Foundry Company, will succeed the late William McMillan in the chairmanship of the board.

The Atlas Glass & Metal Company.—The Wheeling Hinge Company and the Wheeling Metal Company of Wheeling, W. Va.; the Republic Glass Company of Clarksburg, W. Va., and the Atlas Glass Company of Washington, Pa., have been consolidated into one company, to be known as the Atlas Glass & Metal Company, with headquarters at Wheeling, W. Va. Charles N. Brady of Washington, Pa., who is also president of the Hazel Glass Company, at Washington, Pa., is president of the new concern; W. S. Brady, who is president of the Fostoria Glass Company, at Moundsville, W. Va., is vice-president, and J. C. Brady, formerly secretary of the Wheeling Hinge Company, is secretary and treasurer of the new concern. It is the intention to manufacture at the Wheeling Hinge Company plant supplies and trimmings of all kinds for glass, but the business of the Wheeling Hinge Company will be continued as heretofore, it being run as a separate department, and the only change will be that some new and improved machinery will be installed for increasing their facilities, so as to enable the Wheeling Hinge Company to largely increase their output of hinges, bolts, nuts, washers and fire shovels and special stampings and forgings and such other goods as they have been making heretofore.

OBITUARY.

JOHN A. JOHNSON.

John A. Johnson, president of the Gisholt Machine Company, Madison, Wis., died at his home on the 10th inst., after a long illness. He was born in Gisholt, Holden parish, Norway, April 15, 1832. His parents came to America when he was but 12 years old, settling in Walworth County, Wis. He worked on the farm in the summer and taught school in the winter. In 1862 he and M. E. Fuller started the implement business in Madison, which from small beginnings has grown to be one of the largest of its kind. Mr. Johnson's inventive mind no less than his shrewdness was of the greatest value to the firm, and the large line of implements manufactured was mainly the product of his ingenuity. A dozen years ago Mr. Johnson organized the Gisholt Machine Company for the manufacture of machine tools, naming the company after his birthplace. Associated with him in this enterprise were his four sons. He was president of this company, as he also was for years of the Fuller & Johnson Company. He was the chief organizer of the Hekla Fire Insurance Company, and for a long time its president. He was also for a time interested in the Beloit Plow Company. He was also heavily interested in some of the Madison banks, and was one of the wealthiest and most prominent Scandinavians of the Northwest. But Mr. Johnson's activities were not confined to business alone. He was deeply concerned in all public questions, and a hearty supporter of all movements for the civic weal. Many political honors came to him and many more might have come had he yielded to the solicitation of friends. He was actively engaged in philanthropic undertakings, established a fund to support needy students in the University of Wisconsin, and founded a home for aged people. Despite his early disadvantages, he was a deep student along many lines, and was recognized as an authority in them. He had a direct and lucid style, and his articles in both English and Norwegian attracted wide attention. Few writers in the Northwest had a clearer grasp of the tariff question, while in politics, education, finance, machinery and agriculture he was also deeply read. In 1896 he was elected president of the National Association of Implement and Vehicle Manufacturers and represented that association in the delegation sent to South America in the interest of greater international trade by the National Association of Manufacturers, and this was followed by an interesting paper from his pen on "South America: Its Resources and Possibilities." Mr. Johnson is survived by a widow, four sons and a daughter. The sons have all mastered the machinist's trade, and the manifold details of the business in which their father was interested, and there will be no break or stop in the Fuller & Johnson & Gisholt Works by reason of Mr. Johnson's death. For some time past the management of the Gisholt plant has been almost entirely in the hands of the sons, while that of the Fuller & Johnson has been guided by Samuel Higham, vice-president of the company.

NOTES.

WILLIAM S. WEIR, ex-president of the Weir Plow Company, died in Monmouth, Ill., November 14, aged 66 years. He invented the first straddle row cultivator and manufactured it for some years. He was president of the People's National Bank of Monmouth, the State Bank of Alexis and the Bank of Little York.

WILLIAM MCMILLAN, chairman of the board of directors of the American Car & Foundry Company, died in St. Louis, of pneumonia, aged 60 years. He was born in Hamilton, Ont., and was a brother of United States Senator James McMillan of Michigan.

CYRENIUS JOHNSON, of the Johnson-Barnes Hardware Company, Lafayette, Ind., died suddenly of heart failure on the 11th inst. Mr. Johnson was born near Leesburg, Highland County, Ohio, February 7, 1823. For 56 years he had been prominently identified with the development of Lafayette. For the long period of 47 years Mr. Johnson had been continuously engaged in the hardware business.

COL. EDWIN L. HOBSON, for many years connected with the Tredegar Iron Works, Richmond, Va., and a distinguished soldier of the Confederate Army in the Civil War, died suddenly on November 10, at his home in Richmond, from heart disease, aged 66 years.

EZRA GOULD, founder of the Gould & Eberhardt Machine Works of Newark, N. J., died in that city on November 2, having attained the age of 93 years. Mr. Gould was one of the pioneer machine tool builders in this country, entering the machine business about 80 years ago, when he began as an apprentice at the Rogers Works of Paterson, N. J. At this time the Rogers Works made only textile machinery and did general repairing. Mr. Gould was one of the first to use a steam engine in the city of Newark, and was always very original in his ideas and enterprising in his business affairs. An exhibit of his machines at the Crystal Palace Fair, held in New York in 1851, brought him a silver medal, an award very highly prized at that time.

The Banker and the Business Man.*

If the community in and around Pittsburgh owes much to that grand man whose name is a synonym for business success, certainly it owes an equal debt to its banking interests, whose safe conservatism and wise policy have ever maintained the supremacy of our general business interests, and have been the foundation upon which our success has been built.

I wonder if you, gentlemen, realize the estimation in which you are held by the public generally. If "in the olden day, to be a Roman was greater than to be a king," certainly in this later day "to be a banker is greater than to be a king," for kings do move and reign only by the sufference of that greatest of all banking institutions, the Rothschilds. You may not all quite realize your proud pre-eminence, but you have it just the same. The public is envious of your general wealth. They say, look at their hours—nine to three. You have the eight-hour system beaten a mile. You have plenty of time, and, since the old proverb says (and no one has ever disputed its truthfulness), "Time is money," it naturally follows you have plenty of money. We admit with sadness, however, in some cases the demonstration of this syllogism might be somewhat more difficult than the mere making of the statement.

"Banker" and "business man" are, or ought to be, synonomous terms, in that every banker is assumed to be, and he ought to be, a business man, though every business man be not a banker.

The broad term "business man" may be defined as applying to one who has made a study, through observation and experience, of the rules applying to ordinary business transactions. The basis of all business is common sense, and it is influenced by the conditions surrounding each particular transaction. There may be involved questions of policy, questions of law, questions of credit, to the solution of which we bring to bear our judgment and our knowledge of this and similar cases. So far we tread the same path, and so far our interests are identical.

I may be pardoned, however, if I make the statement that when the roads branch the business man, particularly in these days, enters upon a broader path than the banker. Money is always conservative. We attach no blame to that, but if business moved as conservatively we could get along with less banks. Money, if regarded alone, narrows a man's vision; business broadens it. Money is accustomed too often to gauge a man by his dollar's worth only; business is compelled to consider his moral worth as well. By all of which I would say that the more a banker is a business man the better banker he is.

But when this point is reached I begin to feel that it is an act of supreme impertinence to attempt to teach the members of this association business principles. I realize too deeply how much we are indebted to the banking community. Without it and the magnificent system of credit under which it stands, business would be impossible. I would, therefore, endeavor to treat the terms not only as synonymous, but also as correlative.

You will agree with me, however, I think, in what has been said, when it is comprehended that the transactions of one single corporation, based upon their recent statement, are greater in value than those of the 14,000 odd banks in the United States, and that their earnings will exceed those of the 3500 national banks of the country. Consider, then, all the various business institutions and corporations of the country, and in this view the banking interest constitutes a very small part of the great business community, though it wields a power and an influence vastly disproportionate to its actual transactions. Coming a little nearer home, the total clearings of the Pittsburgh banks in 1900 were, in round figures, $1,700,000,000; the transactions of the Carnegie Steel Company during the same period were one-twelfth of the clearings. Our payroll amounted to $15,000,000 and we disbursed to the railroads for freights another $10,000,000.

I am not certain that I have made my meaning clear, but the two terms are so interwoven that it is difficult to disassociate them or to draw a line of demarcation between them—the banker being a business man.

And yet failures in banks occur as they do in business. A defaulting bookkeeper is no worse than a defaulting cashier, and the rules of watchfulness apply even more to a bank than to a business house, for more diverse interests are affected.

We are accustomed to hear capital and labor spoken of as the "twin handmaids" of success. Much more so are banking and business. Without banking commercial transactions could not be accomplished; without such transactions there would be no need of the banker. It is literally true, "united we stand; divided we fall."

Another thought may be of value. It is not original. Few thoughts nowadays are. When the Clearing House system was adopted the banks made a great step in the direction of consolidated interests. Would not business be better subserved if now a further step should be taken and the so-called "trust" idea adopted to the extent, at least, of a greater consideration for each other's interests? Let us suppose there has been a period of great prosperity; loans have been expanded; everything is on a boom basis. A cloud appears in the financial sky and every one rushes for cover. Reserves must be increased at no matter whose expense, and "may the devil take the hindmost." I believe the idea has been partly worked out in New York for a sustaining interest in such cases. Probably it is so here. Panics should be—I believe can be—if not entirely prevented on such lines, at least have their severity mitigated.

And lastly, gentlemen, is it not true that the vast selfishness affecting all interests where money is the dominant factor has narrowed the vision of all of us; has caused us to ignore our duties to society, to the State, to the municipality? Is it not on account of this selfishness that we neglect the commonest principles of citizenship, and are only awakened when those financial interests are directly and radically affected? Is there nothing better in life than the accumulation of wealth—the transaction of business?

If these vast and powerful interests of banker and business man should demand better laws, better government, higher social requirements, and stand together to enforce these demands, there would be no more "fat frying," no more blackmail, but better men, better business in politics, better government in municipality and State—possibly in nation. "Civic righteousness" is a beautiful term, but no one ever saw its realization. "Business" and "ideals" seem opposite, if not antagonistic terms; yet I believe it is possible to interweave them. The dreamer has no place in business is a business axiom. There was once another axiom that the scholar is out of place in politics. Events have falsified that axiom. May not enough of the dreamer's enthusiasm be implanted in the business man, the banker, to give him a higher purpose—a nobler calling?

Success does not always vindicate methods, however it may be worshiped.

* An address delivered at Pittsburgh on Tuesday evening, November 18, before the Bankers' and Bank Clerks' Mutual Benefit Association, by Henry P. Bope, first vice-president and general manager of sales of Carnegie Steel Company.

MANUFACTURING.

Iron and Steel.

Ground has been broken for the new plant of the Ohio Steel & Iron Specialty Company, at Cuyahoga Falls, Ohio. The concern will make hollow and solid staybolts, bolts, angles, channels, tees, light railroad iron, small structural iron flats, and bars. The plant is expected to be in operation in January, 1902.

The Griffiths Charcoal Iron Mills of Washington, Pa., have been chartered with a capital of $200,000. They are building a new tin mill at Washington, work on which has been under way for some time.

It is possible that the plant of the United States Drawn Steel Company, at Buffalo, will be removed to McKeesport, Pa. Negotiations are on between the company and the Board of Trade of McKeesport, looking to the securing of a desirable site.

No. 2 Furnace of the National Steel Company, at Youngstown, Ohio, has been blown out and will be repaired.

The output record at the Sharon works of the National Steel Company, at Sharon, Pa., was broken on two succeeding days last week. On one day in two turns 665 tons of steel were made, and on the following day 676 tons were turned out. The best previous record at this plant in 24 hours was 602 tons.

The report that the Struthers Furnace Company would build a new blast furnace at Struthers, Ohio, is incorrect. The Struthers stack of this concern is idle at present, undergoing ordinary repairs, and this probably gave rise to the report that a new stack would be built.

Blast Furnace No. 1 of the Burden Iron Company, Troy, N. Y., was blown in November 6.

The Susquehanna Iron & Steel Company, Columbia and Philadelphia, Pa., are asking bids for buildings and machinery for the $100,000 pipe mill they are to erect at the former city. It will be a three-furnace mill and will be in operation by June. All communications should be addressed to John Q. Denney, general manager, Columbia, Pa.

The Cumberland Nail & Iron Works, Bridgeton, N. J., have been sold to a party of capitalists who will continue the operation of the plant. It is probable that some improvements will be made.

Joseph Wharton, Philadelphia, Pa., advises us that ground has been broken for the foundations of his new No. 3 Furnace, at Port Oram, N. J., and that the construction of the plant will be continued immediately.

The bi-monthly settlement of the puddling and bar mill wage scales was made in Youngstown, Ohio, last week. The average price of shipments of iron bars by the mills for September and October did not warrant any advance in wages, and puddling for November and December will remain on the basis of $5.50 a ton.

The 13-inch merchant bar mill, at the Duquesne Steel Works of the Carnegie Steel Company, at Duquesne, is about finished and will probably be started this week. The 10-inch bar mill was started some time since and has already made great records for output.

The Bessemer plant of the Republic Iron & Steel Company, at Youngstown, Ohio, is closed down at present, owing to an accident, and the mill will likely be off for a week or two.

Rapid work is being done on the additions to plants and the building of the new mills by the Labelle Iron Works, at Steubenville, Ohio. The company recently increased their capital stock to $3,000,000 and are putting in a new open hearth steel plant and blooming mill and are adding a tube mill. The Labelle Iron Works are not in any way identified with the Pope Tin Plate Company, now building a plant in Steubenville, but will probably sell material to that company.

It is probable that the Warren plant of the National Tube Company, at Warren, Ohio, which has been idle for some months, will be started up before long. The plant was recently visited by a number of officials of the National Tube Company, in connection with W. L. Kaufmann, manager of the Youngstown district, and it was found that with some slight repairs it could be started up in a short time.

General Machinery.

The Board of Trade of Martinsburg, W. Va., have bought from the Baltimore & Ohio Railroad the shops of the road located at that place. The Board of Trade have donated the shops to a large manufacturing company who will remove to Martinsburg from the North.

Rapid work is being done on the new foundry and machine shops being erected by the W. B. Pollock Company, Youngstown, Ohio, on the Himrod Furnace property, on the outskirts of Youngstown, and which the firm purchased some time since. This plant will have modern equipment throughout and will be ready for operation early in the new year. The firm are also erecting a fine office building and have recently moved into a temporary structure near the new works, which they will occupy until the new office is finished.

The Clyde Iron Works, Duluth, Minn., have purchased a plot of ground, 225 x 220 feet, adjoining their plant. The plant, on Fifth avenue, West, will be moved in the spring to the newly acquired property, and there will probably be some other improvements in the way of new buildings.

The Pittsburgh Portable Forge Company, Limited, of Pittsburgh, have decided to wind up their affairs, and liquidating trustees have been appointed for that purpose.

The Nungesser Electric Battery Company of Cleveland will commence work at once on the erection of a new plant, with a view to securing a capacity of 10,000 sets of batteries per day. The building will be 130 x 140 feet, and they will require considerable brass working machinery.

D. & G. Griese of Cleveland, general contractors and engineers, have taken the contract to build the new plant of the National Acme Mfg. Company, who are a combination of the National Mfg. Company of Cleveland and the Acme Machine Screw Company of Hartford, Conn. They will endeavor to have the plant ready for business by February 1.

The Hill Clutch Company of Cleveland, who not long ago commenced the manufacture of shafting, have purchased the plant formerly occupied by the Thompson Mfg. Company in Cleveland, and are remodeling it and equipping it with new machinery for their shafting department. The removal of this branch of their work to the new building will give them more room in the old plant for their clutch and transmission machinery business.

The Bessemer Gas Engine Company, Grove City, Pa., manufacturers of Bessemer gas engines and Bessemer gas cylinders, are making experiments for the Maryland Steel Company, at Sparrows Point, Md., with a view of using furnace gas as a fuel for the Bessemer gas engine. The result of the experiments has not been ascertained, nor has any contract for engines been placed.

The Eastern Forge Company, 71 Kilby street, Boston, Mass., advise us that the directors of their company have under consideration the removal of their works from Nashua, N. H., to some other locality, with a strong probability that in the end the removal will be made. If this is done, the company will be in the market for new buildings of heavy steel construction, electric traveling cranes and other equipment.

The H. N. Strait Mfg. Company, Kansas City, Kan., manufacturers of scales, cooperage machinery, hay presses, &c., will shortly be in the market for a complete equipment of machinery for their new machine shop. The company have recently purchased 3 acres of ground adjacent to their plant and will within the next two weeks begin the erection thereon of a boiler room, equipped with three 100 horse-power boilers; foundry, 100 x 200 feet, and a machine shop, 100 x 200 feet, all to be of brick construction. These buildings will be devoted exclusively to the building of Corliss engines, which line of manufacture they propose taking up.

Though the main part of the plant of A. D. Cook, Lawrenceburg, Ind., manufacturer of tube well supplies, steam pumps, &c., was destroyed by fire November 2, the interruption of business will be of short duration, as the molding and blacksmithing shops, newly erected pattern rooms, offices, &c., were saved, and the branch establishment in the suburb of Greendale is ready to supply most of the goods required. The burned part is being rebuilt as rapidly as possible, new machinery is being installed and all orders are being filled promptly, with the exception of a few small items which, though not yet in stock, can be supplied within a reasonably short time.

Wm. Bros, proprietor of the Nicollet Island Steam Boiler Works, Minneapolis, Minn., is in the market for about $48,000 worth of machinery for his new boiler works, which will be equipped with traveling cranes and all modern machinery. A new power house will also be built. It is probable that a structural shop, together with machine shop and foundry, will be erected in the near future.

The Jacobson Machine Mfg. Company, Warren, Pa., are organizing as a stock company, and are adding to their plant a new foundry. The company manufacture clutch pulleys, power transmission machinery, &c. They will shortly put on the market a new patent vise.

The Chicago Ornamental Iron Company, Chicago, Ill., have moved into their new plant at Thirty-seventh street and Stewart avenue. It consists of a pattern shop, 50 x 94 feet, two stories; fitting shop, 70 x 150 feet, two stories; foundry, 50 x 150 feet; plating room, 40 x 90 feet, and bending room, 40 x 40 feet. These buildings are all new and equipped throughout with modern appliances.

Boilers, Engines and Accessories.

Wm. Bros, proprietor of the Nicollet Island Steam Boiler Works, Minneapolis, Minn., is in the market for about $48,000 worth of machinery for his new boiler shop, which with the new power house will cost $40,000 to build. Six acres of ground on the Great Northern Railroad, with 500 feet of trackage, has been purchased, upon which the new works will be erected. The boiler shop will be 112 x 300 feet, of brick and iron construction, and will be equipped with traveling cranes and all modern machinery. The new plant will be run in addition to the present works, 100 x 200 feet, which have been found too small to take care of the

growing business. It is the intention of Mr. Bros to reach out for the heavier class of work, and to make a first-class water tube boiler in addition to the work now being done. It is probable that a structural shop, together with machine shop and foundry, will be erected in the near future.

The Commonwealth Motor Company have secured a plant at Avon, Mass., which they are equipping for the manufacture of gasoline engines.

The H. N. Strait Mfg. Company, Kansas City, Kan., will erect three new buildings to be devoted exclusively to the building of Corliss engines, which line of manufacturing they propose to take up in connection with their present business.

Walsh & Weidner, Chattanooga, Tenn., have just installed a large steam hammer. They are now building for the United Railways, Light & Water Company, Philadelphia, Pa., a 400 horse-power internally fired boiler; for the steamer "E. B. Lane" of Norfolk, Va., one large Scotch marine boiler; for the Old Dominion Iron & Nail Works, Richmond, Va., two large waste heat boilers; for the Louisiana & Texas Lumber Company, Colthorpe, Texas, 14 66 x 22 feet high pressure boilers, and for the same company one saw mill refuse burner. They have shipped to Ragley & Sons, Timpson, Texas, seven high pressure boilers, and just completed a 750 horse-power internally fired boiler plant for the Texas & Pacific Railroad at Westwego, La., and a 900 horse-power vertical safety water tube plant to the Trussville Alabama Furnace, Trussville, Ala.

The Schroon River Pulp & Paper Company, Warrensburg, N. Y., have commenced the erection of a new mill, 300 x 40 feet, with an ell 80 feet wide. Besides paper making machinery the company are in the market for two 300 horse-power engines and boilers.

The Henry Pratt Boiler & Machine Company, Chicago, Ill., have purchased the plant and real estate at 869-877 Halsted street, formerly occupied by the Tobin & Hamler Mfg. Company. The price paid was $49,400.

The Stilson Rotary Engine & Power Company, Tampico, Ill., will shortly incorporate for the purpose of manufacturing a rotary engine, the patent for which is to issue November 26. The company would like to hear from manufacturers of force feed lubricators. Communications should be addressed to H. A. Stilson.

Fires.

The plant of the Cambridge Foundry Company, Cambridge, Ohio, was recently destroyed by fire. Loss is $2500, partly covered by insurance.

On November 15 the plant of the Wellsville Whip Company, Wellsville, Pa., was destroyed by fire. Loss is about $100,000, partly covered by insurance.

The factory of the Brooklyn Glycerine Mfg. Company, at 251-255 Greenpoint avenue, Greenpoint, Brooklyn, N. Y., was last week destroyed by fire. The loss is about $30,000.

The plant of the Cudahy Bros. Packing Company, at Kansas City, Mo., suffered a $150,000 loss by fire November 15.

Foundries.

The S. Obermayer Company of Cincinnati and Chicago, dealers in foundry supplies, will open a branch house in Pittsburgh, where they will carry in stock a full line of equipment for iron, steel and brass foundries. A building has been secured, 40 x 100 feet, with yard room of the same size, and the building will be extended to 80 x 100 feet. William Fitzpatrick, already well known to the Pittsburgh trade, and A. Rosenburg, from the Cincinnati plant, will have charge of the Pittsburgh house.

The Finch Mfg. Company, Scranton, Pa., manufacturers of mining and general machinery, are extending their foundry 50 per cent., and are putting in a new brass foundry. They have recently erected a new boiler house and installed a new plant. Several new machines have been installed in the machine shop. They are not in the market for any equipment at present.

Port Huron, Mich., capitalists, many of whom are largely interested in the Port Huron Engine & Thresher Company, have organized the Port Huron Malleable Company. Plans have been prepared and contracts have been let for the erection of a malleable iron foundry, with a daily capacity of about 10 tons, and it will be so constructed as to admit of enlargement as the demand for the products increases. The company have assurances of a large outside business which, with the home consumption, they expect will tax the capacity of the plant from its inception. They have secured the services of Richard Corcoran, for 12 years superintendent of the Albion Malleable Iron Company, Albion, Mich., as general manager and superintendent.

The Penn Steel Casting Company, Chester, Pa., elected M. H. Bickley president, George M. Booth, secretary and treasurer, and Frederick Baldt, general manager.

The A. W. Stevens Company, Marinette, Wis., manufacturers of threshing machinery, have let contracts for the erection of an addition to the foundry which will double the present capacity. At the annual meeting of the stockholders it is probable that a still further enlargement of the plant will be recommended.

A complete foundry equipment will be required by Cochran & Crawford, a new firm, who have purchased a plot of ground in Sterling, Ill., upon which they will erect a foundry, 75 x 50 feet, of brick, and several smaller buildings.

G. L. Anderson, East Birmingham, Ala., has completed his brass foundry and now has it in operation.

A quantity of new equipment will be required by McClave & Brooks, Scranton, Pa., founders and grate manufacturers, who have purchased a 13-acre tract of land on the New York, Ontario & Western and Delaware & Hudson Railroads, and near the branch of the Delaware, Lackawanna & Western Railroad. Upon this property they will erect a new plant, which will be considerably larger than the present one. Work will be started as soon as possible and bids will be invited from contractors.

The Seybold Foundry Company, Dayton, Ohio, recently incorporated, are building a large brick foundry and fire proof pattern house, which will be equipped with the most modern appliances. The company have secured two large contracts which will keep the foundry busy for the first year. The officers are Charles Seybold, president; J. Edward Sauer, secretary and treasurer, and Joseph Burns, general manager.

The National Foundry & Machine Company have been organized at Terre Haute, Ind., for the purpose of manufacturing hay presses, &c., and to do a general foundry business. A new plant will be built, but the site has not yet been selected. J. B. Bergmann is president.

The J. D. Smith Foundry Supply Company, proprietors of the Cleveland Facing Mills, are erecting a large addition to their extensive plant at Cleveland, Ohio. Warehouse capacity for machinery and supplies has been increased by leasing the five-story building at 36, 38 and 40 South Water street, in same city.

Bridges and Buildings.

The Milwaukee Gas Light Company, Milwaukee, Wis., will within the next two weeks let the contract for the foundations for their new $1,000,000 plant. They advise us that they will be ready to commence the erection of the superstructure about April 1, contracts for which will be let between now and January 1.

The Elkhart Bridge Company, Elkhart, Ind., recently organized, will build a new plant for the manufacture of iron, steel and stone bridges and structural work, to consist of a main building, about 60 x 200 feet, power house and wood shop, and office building. The plant will be equipped with modern machinery, including a compressed air plant. Work of construction will begin this week. F. W. Fahlgren, who is at present with the American Bridge Company of Trenton, N. J., will be superintendent, and Frank Brumbaugh, lately with the Canton Bridge Company of Canton, Ohio, will have charge of the selling and erecting of the work. M. U. Demarest is treasurer.

Robinson & Co., Richmond, Ind., manufacturers of threshing machinery, are about ready to contract for a new building, 104 x 136 feet, to be erected adjoining the present works. It is to be used as a setting-up and stock room.

Hardware.

John S. Fray & Co., Bridgeport, Conn., old established manufacturers of Spofford braces, sleeve, ratchet and drill braces, hand and breast drills and tool sets, have just completed two additions to their original factory. The new buildings are on either side of the old shop and are joined thereto. Both are built of brick, have four floors, and are 68 x 40 and 22 x 40, respectively. These additions will afford double the former shop room and will, it is hoped, enable the company to keep pace with the demand for their goods, orders for which have been crowding them for some time past.

Geo. William Hoffman, 295 East Washington street, Indianapolis, Ind., manufacturer of the U. S. and other brands of metal polishes, reports that the demand for his specialties is good and steadily improving. Advices as to business from his Chicago, New York and San Francisco branches are very satisfactory, while the correspondence from foreign agencies is also very encouraging.

The Kirk-Latty Mfg. Company, Cleveland, have had such an extraordinary run of business in nuts, bolts, wood screws, &c., that they have orders sufficient to keep them running six months ahead. In order to handle this increased business the company find it necessary to increase the size of their plant by the addition of another story throughout the entire factory. This work will be done immediately and will increase the size of the plant about one-third, enabling them to turn out about one-third more goods than at present.

The Kilby Mfg. Company, Cleveland, report more business in the way of manufacturing sugar machinery than ever before. The rise of the beet sugar industry in the West has had much to do with this increase of business. Contracts are now on hand for sugar manufacturing plants at Mt. Clemens, Mich.; Carrollton, Mich.; Wallaceburg, Ont.; Eaton, Col., and Loveland, Col. Before the last named plant could be finished the contract was increased so that the factory will be double the size originally contemplated.

The Chattanooga Steel Roofing Company, Chattanooga, Tenn., are now, as during the whole of this year, very busy filling contracts for roofing and their other lines, for home and export trade.

The Southern Single Tree Company, 25 Market square, Chattanooga, Tenn., have been organized, to manufacture single trees, double trees, hames, and also hatchet, hammer and other varieties of small handles.

The Chattanooga Implement & Mfg. Company, Chattanooga, Tenn., have secured the exclusive right to manufacture the line of Gardner pea shellers formerly made by I. N. Gardner & Co., Dalton, Ga. These machines are made in four sizes. The company have recently added a building to their plant, and contemplate another extension in the near future.

For the past 15 years the Taylor-Boggis Foundry Company, Cleveland, Ohio, have rented a piece of land adjoining their place of business from the Iron Clad Paint Company. About four months ago they began negotiations to secure the property which had been in their possession through lease, and a few days since the transaction was completed. The land, which is situated at 537-541 Seneca street, has 100 feet front and is about 200 feet deep. It sold for $14,000 cash. There are several buildings upon the land, all of which have been used as store houses by the Taylor & Boggis Company. The company have increased their business so much lately, however, that they needed new buildings, the erection of which will be commenced before long.

Miscellaneous.

The J. A. Weston Company, Syracuse, N. Y., manufacturers of steel spoke wheels, metal hubs and coaster brakes, advise us that they have purchased all the machinery for the new plant that they are equipping at Jamesville.

The Metal Goods Mfg. Company of Cleveland, who commenced about a year ago the manufacture of wire wheels, express wagons, &c., are finding it necessary to increase their capacity.

William Tinkham & Co., manufacturers of worsted goods, are building a new mill, 45 x 135 feet, three stories, at Harrisville, R. I. They will also build another mill, 54 x 250 feet, of brick, one-half to be two stories and the other three.

The Post & Sheldon Silk Company, Paterson, N. J., have purchased, for $7500, the Dover Hosiery Mill, Dover, Del.

The American Bank Protection Company, Minneapolis, Minn., recently organized, with a capital stock of $250,000, will erect a new plant for the manufacture of electrical devices for the protection of banks and other buildings. The incorporators are: F. E. Kenaston, president of the Minneapolis Threshing Machine Company, and O. B. McClintock of Minneapolis, Minn.; F. C. Robinson and J. E. Green of Council Bluffs, Iowa, and A. McClintock of Kansas City, Mo.

The Illinois Central Railroad Company advise us that there is no truth in the report that they intend to erect a repair shop and roundhouse at Jackson, Miss.

The Moore Plow & Implement Company, Greenville, Mich., are building and equipping an entirely new plant, which they hope to have in operation by January.

The Philadelphia Steel & Copper Plate Company, 46 North Tenth street, Philadelphia, Pa., have incorporated, with a paid in capital of $10,000, for the purpose of manufacturing steel plates and dies, copper, zinc and brass plates for engravers, newspaper work, &c. They have purchased the plant of C. R. Windhoevel & Son and are equipping it with considerable new machinery. Charles Windhoevel is secretary and treasurer.

All of the equipment has been purchased by the Firth Carpet Company, Firthcliffe, N. Y., for the new buildings now under construction at their plant. These consist of a three-story building, 65 x 58 feet, and a two-story addition, 65 x 65 feet, to the weaving room. A new printing building, 65 x 160 feet, one story, has been recently completed.

F. W. Whittemeier's Sons, Amsterdam, N. Y., are building a new engine house and an addition, 20 x 25 feet, to the main building of the Howard broom factory, which they recently purchased from the American Broom & Brush Company.

Richard Thorpe, Frankford, Philadelphia, Pa., manufacturer of damask, will shortly be in the market for the machinery for the addition to the factory now in course of construction. It will be used for dyeing and finishing.

The organization of a company to build an ice plant has been effected by S. Pand, J. E. Kramer, H. E. Thomson and others of Wellington, Kan., and contracts will be let in a few days for the erection of a $20,000 plant.

The Capron Knitting Company, Utica, N. Y., have let the contract for the erection of a four-story brick building, 42 x 100 feet.

The Ice & Cold Storage Company of Los Angeles, Cal., are building an ice house to hold about 3000 tons, and are adding another condenser, new boilers, &c. The company intend to double their output next season. No new equipment is required at present.

The Attawaugan Mfg. Company have let the contract for putting in extensive water works to supply their two villages, Attawaugan and Ballouville, Conn., from the Aspinoch mineral spring on East Putnam Heights.

Plans are being drawn and preparations made for the construction of the large addition to the present factory of the Warner Elevator Mfg. Company on Spring Grove avenue and Alfred street, Cincinnati, Ohio. A plot of ground, 56 x 490 feet, has been purchased, upon which the new buildings will be erected in the spring. This, with the adjoining property which they own, will give the company a large amount of needed additional room and allow for a large increase in capacity.

H. Wm. Dopp & Son, Buffalo, N. Y., manufacturers of steam jacketed specialties for soap makers, candy makers, packing houses, &c., have incorporated their business under the same name and are putting in foundry facilities for making specialties in their line. The officers and directors of the new company are: W. H. Dopp, president; H. B. Sweitzer, vice-president; A. L. Coon, secretary and treasurer; E. W. Smith and W. R. McConnell.

Cobb & Drew, Rock Falls, Ill., manufacturers of rivets, tacks and nails, advise us that they are building a brick storehouse, 150 x 70 feet, and expect in the spring to build a two-story brick factory building. They are not at present in the market for new equipment.

The La Crosse Implement Company, La Crosse, Wis., have incorporated, with a capital of $150,000. They are a branch of the La Crosse Plow Company, and besides handling the goods of that company, a full line of agricultural implements will be carried.

The King Paper Company, recently organized, have purchased the Gleisner property on Lake street, Kalamazoo, Mich., and are having plans prepared for the erection of a large plant thereon.

The Prizer-Painter Stove & Heater Company, Reading, Pa., intend during the coming year to build another large addition to their plant. The company only recently completed a large addition to the foundry.

Grafton Johnson of Greenwood, Ind., advises us that he is interested with others in the erection of a plant at Indianapolis for the manufacture of cans by automatic machinery. The business will probably be conducted under the name of the Indianapolis Tin Can Company.

The Elgin Wind Power & Pump Company, Elgin, Ill., are erecting a five-story brick addition to their plant, which will be used for the manufacture of steel towers and tanks.

The Indiana Scale Truck Company, Bluffton, Ind., have incorporated for the purpose of manufacturing the Parsell weighing trucks and other trucks. The officers are: C. W. Parsell, president; R. F. Cummins, vice-president, and L. B. Stevens, secretary and treasurer.

The Rhode Island Worsted Company, recently incorporated, will locate at Indian Orchard, Mass. They are putting in 50 Crompton & Knowles broad looms. Daniel N. Brown of Manton, R. I., will be treasurer and manager of the plant.

The Benedict & Burnham Mfg. Company, Waterbury, Conn., brass and copper rolling and wire mills, have let the contract for the erection of an acid house, 50 feet square, of brick and iron construction.

The Consolidated Pump Company, Toledo, Ohio, will at once commence the erection of a new plant at Sylome avenue and the L. E. & W. R. R., comprising two buildings, 80 x 250 and 60 x 100 feet, respectively, for the production of wood pumps, door and window screens and other specialties. The new plant will have double the present capacity and is expected to be ready for occupancy within 90 days.

The W. L. Douglas Shoe Company, Brockton, Mass., have purchased the equipment for the addition to their plant.

To replace the buildings recently burned, the Armour Fertilizer Works, at Baltimore, Md., are erecting a new plant, with a capacity of 15,000 to 20,000 tons, with electrical transmission throughout. The equipment has been purchased.

The Hatch Electric Smelting Company, Detroit, Mich., are preparing to remove their plant from Green Bay, Wis., to Newaygo, Mich.

F. M. Hicks of the Hicks Locomotive & Car Works, Chicago, has secured a contract to furnish an official car to James T. Wright, president and general manager of the Macon, Dublin & Savannah Railroad. The car is to have a capacity for eight people, observation ends, Session's steel platforms, a 15-foot dining-room and Baker heater.

Former employees of the Star & Monongahela tin mills of the American Tin Plate Company, at Pittsburgh, by a vote of 197 to 3, have rejected the proposal to open these mills to members of the Amalgamated Association. It will be recalled that before the strike was ended both these plants were started up with non-union men, and the Amalgamated Association is no longer recognized, and no members of that organization can work in either of these mills and be a member in good standing. Both plants are in full operation, and have been for a long time.

Over $7,080,000 in gold bars, the largest withdrawal from the Assay Office in one day on record, and the largest shipment to be consigned to one transatlantic steamship, left New York on Tuesday on board the "Kaiser Wilhelm der Grosse" for Europe.

The Iron and Metal Trades.

The special feature of the business of the past week has been the very great activity in Pig Iron. The demand has been heavy from the Steel manufacturers, the largest transaction being the purchase of 40,000 tons for December delivery from the Bessemer Furnace Association by the United States Steel Corporation at $15.25 at the furnaces. Eastern buyers have also been taking good tonnages, but have not secured all they need. The purchases made by Steel manufacturers, large as they were, are believed to have been exceeded by those made by foundrymen. The quantities purchased by the latter have generally been small, but so numerous as to make a heavy aggregate. The Southern furnace companies have advanced their prices on foundry grades 50c., now quoting on the basis of $11.50, Birmingham, for No. 2 Foundry, but the demand for Gray Forge has made that grade exceedingly scarce, and the price has been advanced 75c.

Reports from the Northern Pig Iron producing districts show that the supply of Coke is still inadequate, owing to the difficulty in securing transportation from the Coke ovens, and blast furnaces are running very irregularly, in many cases being banked for two or three days at a time awaiting an accumulation of fuel. The statement is made that in the Mahoning and Shenango valleys at least 12 furnaces may be said to be nonproducers all the time. The difficulty in securing coke is not entirely due to a scarcity of cars, but also arises from the inadequacy of railroad facilities to handle the enormous volume of traffic in all kinds of merchandise. The railroad companies will be obliged to increase their terminal facilities and other appliances for handling traffic much beyond their expectations when arranging for the coming year's improvements.

The consolidation of Eastern Plate mills is said to be an accomplished fact. This will put the Plate trade in a much stronger position, as it is intimated that some uneasiness recently developed over the quantity of business coming up as not sufficient to satisfy the requirements of all the mills. Possibly the condition thus indicated might have corrected itself shortly, as good reports are now coming from the West relative to a much heavier tonnage of Plates being required not only for shipbuilding interests, but also for new railroad equipment which has been ordered.

The shortage in the supply of Steel is proving to be almost a serious matter to many consumers. Efforts are being made by important consuming interests to cover their requirements for Steel during the first quarter of next year, but owing to the fact that the Steel makers are so largely working up their Steel output in their own finishing departments, it is exceedingly difficult to find any available supply. This is causing considerably more interest to be taken in the possibility of securing shipments from abroad. The sales of foreign Billets and Sheet Bars thus far have been small, but it is expected that if present conditions continue the importations will be much larger.

The Western Bar Iron mills have formed an association, and not only propose to maintain prices on finished product, but will also endeavor to regulate the prices paid for Old Material.

A Comparison of Prices.

At date, one week, one month and one year previous.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

	Nov. 20, 1901.	Nov 13, 1901.	Oct. 23, 1901	Nov. 14, 1900
PIG IRON:				
Foundry Pig, No. 2, Standard, Philadelphia	**$15.50**	$15.25	$15.00	$15.50
Foundry Pig, No. 2, Southern, Cincinnati	**14.25**	13.75	13.75	13.25
Foundry Pig, No. 2, Local, Chicago	**15.00**	14 75	14.75	14.50
Bessemer Pig, Pittsburgh	16 00	16.00	16.00	13.50
Gray Forge, Pittsburgh	**14.50**	14.50	14.15	13 00
Lake Superior Charcoal, Chicago	17 00	17.00	17.00	17 00
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh (nom)	**27.00**	27.00	27.00	19.75
Steel Billets, Philadelphia (nom)	**29.00**	29.00	28.00	21.00
Steel Billets, Chicago, (nom)				20 75
Wire Rods (delivered)	**35.50**	35.00	34.00	33 00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	26 00
Spikes, Tidewater	1.80	1 80	1 80	1 45
Splice Bars, Tidewater	1.50	1.50	1 50	1 30
OLD MATERIAL, PER GROSS TON:				
O. Steel Rails, Chicago	14.00	14 00	14.00	10.00
O. Steel Rails, Philadelphia	*17.25*	17.00	17.50	14 50
O. Iron Rails, Chicago	**21.50**	21.00	21.00	17 50
O. Iron Rails, Philadelphia	**21.50**	21.00	20 00	17.00
O. Car Wheels, Chicago	*15.50*	16.00	16 00	15.00
O. Car Wheels, Philadelphia (nom)	*16.00*	16.50	16.50	16.50
Heavy Steel Scrap, Chicago	13 50	13.50	13 50	10.00
FINISHED IRON AND STEEL, PER POUND:				
Refined Iron Bars, Philadelphia	1.62½	1 65	1 65	1 40
Common Iron Bars, Chicago	*1.65*	1 65	1 70	1 40
Common Iron Bars, Youngstown	*1.55*	1 55	1 60	1 25
Steel Bars, Tidewater	**1.70**	1 62½	1 62½	1.35
Steel Bars, Pittsburgh	1.50	1.50	1 60	1 25
Tank Plates, Tidewater	1.75	1.75	1 75	1 50
Tank Plates, Pittsburgh	1.60	1 60	1 60	1.35
Beams, Tidewater	1 75	1 75	1.75	1 65
Beams, Pittsburgh	1.60	1.60	1 60	1 50
Angles, Tidewater	1.75	1.75	1 75	1.55
Angles, Pittsburgh	1.60	1 60	1 60	1 40
Skelp, Grooved Iron, Pittsburgh	1 80	1 80	1 85	1.57½
Skelp, Sheared Iron, Pittsburgh	1.85	1.85	1 90	1 55
Sheets, No. 27, Pittsburgh	3.00	3.00	3.05	2.80
Barb Wire, f.o.b. Pittsburgh	2.90	2 90	2 90	2 80
Wire Nails, f.o.b. Pittsburgh	*2.15*	2 15	2.30	2.20
Cut Nails, Pittsburgh	2.05	2.05	2 05	1.95
METALS:				
Copper, New York	16.85	16 85	16 85	16.75
Spelter, St. Louis	4.12½	4.12½	4.10	4.05
Lead, New York	4 37½	4.37½	4.37½	4.37½
Lead, St. Louis	4.25	4.25	4.25	4.23½
Tin, New York	**27c.**	25.30	24.75	27.90
Antimony, Hallett, New York	*8.37½*	8.37½	8.50	9.50
Nickel, New York	60.00	60.00	60.00	55.00
Tin Plate, Domestic Bessemer, 100 lbs., New York	4.19	4.19	4.19	4.19

Chicago.

FISHER BUILDING, November 20, 1901.—(*By Telegraph.*)

There is some speculative interest as to what the condition of the Iron and Steel markets will be next spring when demand broadens. In some lines, as in Structural Material, the new season will, from present appearances, open with old orders still unfilled. A continuance of present activity means a repetition of last season's delays in getting material, unless production in the meantime increases sufficiently. This impression is abroad and is stimulating buying among manufacturers for delieveries during the first half of 1902. Buyers are already specifying for spring shipment. The railway trade continues the most interesting branch. It is said that the demand for Steel Rails has been more active within the past two or three weeks in the West than in other parts of the country. Certain it is that some of the more Eastern mills, which do not usually depend upon much trade from the West, are now receiving large orders from this territory because of the better deliveries they can make. This Western business is rapidly filling the Eastern mills for next season. There remains a considerable Rail trade in prospect, especially from the interurban lines, which have scarcely yet commenced to buy.

Pig Iron.—One seller of Pig Iron remarks that if buying continues several weeks longer at the rate of the past week or two practically all the requirements for

the first half of 1902 will have been covered. Another seller remarks that the buying has been mainly by the larger smelters and that most of the small foundrymen have not bought far into next year. Trade has been largely checked for the moment by the rise of 50c. in the price of Southern products, which took effect last week. For several days prior to the advance many orders were entered in lots of from 500 to 2000 tons, mainly for shipments during the first half of 1902. Some of the smaller purchasers say they will wait until after January 1 before buying any more Iron. The position of the furnaces seems to be remarkably strong. Furnacemen are not generally seeking trade and their output for the first half of the year is said to be well engaged. The Coke situation continues embarrassing for both furnaces and foundries. Of the better grades there is scarcely any in the market, the entire receipts being applied to contracts, which even then are not wholly filled. The two furnaces which, as noted last week, had to close down because of a lack of fuel, are still idle, and an occasional banking of fires by one or two of the active furnaces shows the precarious nature of present supply. Prices as corrected are as follows:

Lake Superior Charcoal	$17.00 to $18.00
Local Coke Foundry, No. 1	15.50 to 16.00
Local Coke Foundry, No. 2	15.00 to 15.50
Local Coke Foundry, No. 3	14.50 to 15.00
Local Scotch, No. 1	15.50 to 16.00
Ohio Strong Softeners, No. 1	17.25 to 17.50
Southern Silvery, according to Silicon	15.90 to 16.40
Southern Coke, No. 1	15.40 to 15.90
Southern Coke, No. 2	14.90 to 15.40
Southern Coke, No. 3	14.40 to 14.90
Southern Coke, No. 1 Soft	15.40 to 15.90
Southern Coke, No. 1 Soft	14.90 to 15.40
Foundry Forge	13.90 to 14.40
Southern Gray Forge	13.90 to 14.40
Southern Mottled	13.90 to 14.40
Southern Charcoal Softeners, according to Silicon	15.00 to 16.00
Tennessee Silicon Pig	16.40 to 16.65
Alabama and Georgia Car Wheel	19.50 to 20.50
Malleable Bessemer	16.00 to 16.25
Standard Bessemer	.... to 17.50
Jackson County and Kentucky Silvery, 8 per cent. Silicon	16.00 to 16.25

Bars.—There has been good trading in Steel Bars during the past few days. The trade is beneficially feeling the effects of new production, and old orders long unfilled are being wiped off the order books. Buying for the first half of the coming year is a feature. Iron Bars continue quiet, buyers not having yet fully decided what the reduction of two weeks ago meant. There is no further decline, quotations for both Common Iron and Soft Steel Bars being firm at 1.65c. Quotations from stock are unchanged at 2c. for Common Iron, and 1.90c. to 2c. for Steel Bars, and 2.50c. for Steel Hoops.

Structural Material.—Two weeks ago the contract for the train sheds of the new Rock Island Station, requiring about 9000 tons of Shapes, was let. This week the contract for the adjoining building, requiring about 4500 tons of Structural Material, was let. The combined structure will contain more Steel than any building in Chicago. Contracts for two other local structures may soon be let. The small trade continues eminently satisfactory. Mill shipments are quoted as follows: Beams, Channels and Zees, 15 inches and under, 1.75c.; 18 inches and over, 1.85c.; Angles, 1.75c. rates; Tees, 1.80c.; Universal Plates, 1.75c. to 1.85c.; small lots of Beams and Channels from local yards are quoted at 2.25c.; Angles, 2c. rates; Tees, 2.15c.

Plates.—A danger point in Plates is that there are few stocks in the West. When mills run out of specifications they close. Stock is not accumulated to any extent. There are very few store stocks, quite unlike the situation in Sheets under normal conditions. At present specifications in Plates are small, but when the big demand comes there is likelihood of delays, because of this absence of stocks. Prices are firm. Mill shipments are quoted as follows: Tank Plate, ¼-inch and heavier, 1.75c. to 1.80c., Chicago; Flange, 1.85c.; Marine, 1.95c. Jobbers are selling small lots from store at 1.90c. to 2c. for Tank, and 2.25c. for Flange, with the usual extras for heads, segments, lighter gauges, &c.

Sheets.—While progress is being made in the accumulation of Sheets in stock, the latter are not complete and receipts are often absorbed as fast as they arrive. Prices are without further decline. Some sellers continue to quote 3.50c., but these prices do not include all sizes. Many transactions are on the basis of 3.60c. to 3.75c. from store. Galvanized are firm at 65 and 10 to 70.

Merchant Pipe.—There is little change in conditions. The volume of business is above that of a year ago. Prices are very steady. Carload lots are now quoted as follows, random lengths: Black, ⅛ to ½ inch, 60 off; ¾ to 10 inches, 67 off; Galvanized, ⅛ to ½ inch, 47 off; ¾ to 6 inches, 55 off.

Boiler Tubes.—The demand continues uniformly good, with quotations unchanged. Quotations are as follows:

	Steel.	Iron.
2¾ to 5 inches	57½	47½
1¾ to 2½ inches	50	40
1 to 1½ inches	35	30
6 inches and larger	52½	45

Rails and Track Supplies.—In lots of 1000 tons or less there continues a fair business in Standard Sections. The West is a very active buyer and is contributing liberally to the order books of Eastern mills. Inquiries denote that considerable business is still to be placed. There are many plans for interurban lines next summer, but for this kind of construction there has been no buying. There is no decrease in the healthy demand for Light Sections. Seconds and Relaying Rails are snapped up as fast as they appear in the market. Standard Sections are firm at $28, and Light Rails are slightly higher at $30.50 to $35. Track Fastenings are active and strong. They are quoted as follows: Splice Bars, 1.65c. to 1.75c.; Spikes, 2c. to 2.10c.; Track Bolts, with Hexagon Nuts, 2.90c. to 2.95c.; Square Nuts, 2.75c. to 2.80c.

Merchant Steel.—Buying has commenced for deliveries next spring and running through to summer or later. Makers are also turning down some additional business because of overcrowded order books. Prices are strong. Mill shipments, Chicago, are quoted as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.85c. to 2c.; Open Hearth Spring Steel, 2.30c to 2.40c.; Toe Calk, 2.40c. to 2.60c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 55 off in carload lots. Ordinary grades of Crucible Tool Steel are quoted at 6¾c. for carloads and 7c. to 7½c. from store; Specials, 12c. upward.

Old Material.—There is enough resistance to the downward trend of values to give two sides to the market, but buying by the consumers is quite light. They are reported not to be seeking material and to be accepting only such offerings as conform to their ideas of value. Some business is being transacted on a lower range and quotations are modified to conform thereto. The following are approximate quotations per gross ton:

Old Iron Rails	$21.50 to $22.00
Old Steel Rails, mixed lengths	14.00 to 14.50
Old Steel Rails, long lengths	18.00 to 18.50
Heavy Relaying Rails	25.50 to 26.00
Old Car Wheels	15.50 to 16.00
Heavy Melting Steel Scrap	13.50 to 14.00
Mixed Steel	10.50 to 11.00

The following quotations are per net ton:

Iron Fish Plates	$16.50 to $17.50
Iron Car Axles	20.00 to 21.00
Steel Car Axles	18.00 to 18.50
No. 1 Railroad Wrought	15.00 to 15.50
No. 2 Railroad Wrought	13.25 to 13.75
Shafting	16.00 to 16.50
No. 1 Dealers' Forge	13.00 to 13.50
No. 1 Busheling and Wrought Pipe	11.50 to 12.00
Iron Axle Turnings	11.25 to 11.75
Soft Steel Axle Turnings	10.50 to 11.00
Machine Shop Turnings	9.50 to 10.00
Cast Borings	5.00 to 5.25
Mixed Borings, &c	5.25 to 5.50
No. 1 Boilers, cut	11.00 to 11.50
No. 2 Boilers, cut	10.00 to 10.50
Heavy Cast Scrap	11.00 to 11.50
Stove Plate and Light Cast Scrap	8.00 to 9.00
Railroad Malleable	12.50 to 13.00
Agricultural Malleable	11.50 to 12.00

Metals.—The situation in Metals is without notable local change. Copper continues to sell in reasonably good tonnage. Lead is moderately active. Prices are quite firm. Carload lots of Lake are held at 17c., and Casting brands at 16½c. Pig Lead stands steadily at 4.32½c. for Desilverized and 4.42½c. for Corroding, in 50-ton lots. Dealers continue to quote selling prices on small lots of Old Metals as follows: Copper Wire and Heavy, 15c. to 15½c.; Copper Bottoms, 14c.; Pipe Lead, 4.15c.; Zinc, 2.75c.

Coke.—There is no welcome change in the Coke conditions. Buyers of Coke earn it if they get deliveries.

Practically none is for sale through usual channels, odd lots which arrive finding a ready market at a premium above $5 for Connellsville Foundry Coke.

St. Louis.

CHEMICAL BUILDING, November 20, 1901.—(*By Telegraph.*)

Pig Iron.—The advance of 50c. announced by the furnaces last week may have momentarily checked the buying power, but the same steady strong demand ruling before the change is now apparent in the Pig Iron market. Several good round lots are of special note, one of 5000 tons and several of 1000 tons. A noteworthy point is the marked substantial quality of the buyers, no speculative element being apparent in the market. Some transactions in special grades are reported at an advance of 50c. over new figures just quoted. Several instances of furnaces requesting their agents to take no more business for delivery by January 1 has come to our observation. We quote as follows for cash, f.o.b. St. Louis:

Southern, No. 1 Foundry	$15.50 to $15.75
Southern, No. 2 Foundry	14.75 to 15.00
Southern, No. 3 Foundry	14.25 to 14.50
Southern, No. 4 Foundry	13.75 to 14.00
No. 1 Soft	15.25 to 15.50
No. 2 Soft	14.75 to 15.25
Gray Forge	13.75 to 14.00

Bars.—Iron and Steel Bars are still in strong demand and prices are without change since our last report. There is still some complaint heard on the matter of delivery, but a much easier feeling is manifest on this score in all quarters. We quote Iron Bars at 1.70c. to 1.80c.; Steel Bars at 2c. Jobbers quote Iron Bars at 2c. to 2.10c.; Steel at 2.10c. to 2.15c., full extras.

Rails and Track Supplies.—It is hardly possible for the demand in this department of the market to be better, as with the production fully taken so far in advance the mills have no cause for worry in the matter of finding a buyer. In line with the Rail department of the market the demand for Track Supplies is very heavy and prices hold firm. We quote Splice Bars, 1.75c. to 1.95c.; Bolts, with Square Nuts, 2.75c. to 2.90c.; with Hexagon Nuts, 2.90c. to 2.95c.; Spikes, 2c. to 2½c.

Sheets.—Very little change is to be noted in the market for Sheets of all classes and sizes, and the conditions warrant a feeling of satisfaction in the trade. Jobbers quote ¼-inch Plates and heavier at 2.10c. to 2.20c.; Stove Pipe sizes, No. 27 Sheets, 3.45c. to 3.50c.; Galvanized Sheets, 65 and 10 off, and in round lots 70 to 70 and 5 off is quoted.

Angles and Channels.—A satisfactory demand and inquiry rule in the market for small Angles and Channels, and jobbers' prices are named at 2.30c., base, for both class of materials.

Pig Lead.—The market for Pig Lead is without variation from the quiet and steady tendency which has been the ruling condition for some time. Soft Missouri at 4.25c. to 4.27½c., and Chemical at 4.30c. to 4.35c.

Spelter.—A review of the Spelter market for the past few weeks shows a rather remarkable list of transactions, and it is reported that practically all the smelters are sold up to January 1. Price holds firm around 4.12½c.

Philadelphia.

FORREST BUILDING, November 19, 1901.

The complicated movements in the Iron and Steel trades still continue. Everything is at such sixes and sevens that it is difficult to say whether the market is shaping for better or for worse. As regards Pig Iron there can be no difference of opinion, as consumers all want Iron, while very few makers have any to spare. There is plenty for next year's delivery, but even that commands more money, and prices are easily 25c. better than they were last week. The Plate trade is only moderately active, however, and it is believed that some of the Bar mills could turn out more work if they could get the orders. There is no actual dullness, and it is generally understood that there is plenty of business in prospect, but the lack of uniformity is rather confusing. The Plate mills are said to have been greatly disappointed with the pool agreement, as some had plenty of business, while others were frequently so close to the end of their order books that they became very much dissatisfied. This phase of the situation is believed to have suggested the idea of a combination of some of the Eastern Pennsylvania mills, which is now said to be an accomplished fact. The inference is that there was not enough business to go around, and that such an arrangement was entered into as a measure of self protection. If this is the true explanation it is pretty certain that at least one mill will cease active operation, and thereby result in a considerable saving, as three mills running full can do much better than four working on a tonnage which is only sufficient to employ three. Besides this, better prices can be had under one management than would be the case when four were bidding against each other for an amount of business which in any case would be only sufficient for three. Nevertheless, the fact that a new combination is considered necessary to save the market is suggestive of less favorable conditions than were generally supposed to exist. It is difficult to harmonize these diverse operations with the buoyant reports that are met with on all sides, but it will probably not be long before the fog clears away and more settled conditions prevail. Surface appearances indicate an improving market, although at the moment Pig Iron is the chief source of strength, and this may, in a measure, divert attention from other departments which may not be as active as they were some time ago. There is certainly a great shortage in some lines, such as in Pig Iron, Billets, Sheets and Structural Material, while Steel Plates and Iron Bars are in full supply and deliveries can be had about as easily as in ordinary times.

Pig Iron.—The market for Pig Iron has been remarkably strong during the past week, and prices are easily 25c. per ton better, in some cases more than that. The demand has been very heavy, and many large consumers have covered their requirements for the first quarter, and in some cases for the entire half of the coming year. All grades have been freely taken, but Foundry Irons and Iron for Steel making have been specially active, so much so that for this year's delivery about everything that can be picked up is already engaged. The statement of the condition of the furnaces published in last week's issue of *The Iron Age* is the best commentary that can be given of existing conditions, showing as it does the largest production, and the smallest stocks on record. In view of this it would be preposterous to talk bearishly, although it is not at all probable that any important advance in prices is pending. Production is rapidly increasing, and unless consumption keeps on in proportion, it is only a question of time when there will be at least a normal supply of Iron, and besides that there is usually a slackening up toward the close of the year, so that the present shortage may perhaps be considerably lessened during the next two or three months. Be that as it may prices are strong at about the following figures for Philadelphia and nearby deliveries, and about 25c. less for deliveries within a radius of 100 miles south or west: No. 1 X Foundry, $15.75 to $16; No. 2 X Foundry, $15.50 to $15.75; No. 2 Plain, $15 to $15.25; Standard Gray Forge, $14 to $14.25; Ordinary Gray Forge, $13.50; Basic (Chilled), about $14.25, and Bessemer at $15.75 to $16.

Billets.—It is impossible to quote prices on Billets, as there are none offering. The price is supposed to be anywhere from $28 to $30 for this year's shipments, but in the absence of business nothing definite can be said.

Muck Bars.—A considerable amount of business is pending, and large sales will probably be made within a day or two. Recent transactions have been on the basis of $28.25 to $28.75 for nearby deliveries.

Plates.—Business is only fairly active, but there is no such urgency for deliveries as there was some time ago. Rumors are to the effect that a good deal of dissatisfaction has been developing of late in regard to allotments, and this is said to be the reason for a new combination among the Eastern mills, which is believed to be practically completed. It is difficult to verify

many of the statements that are going around, but it is understood that while the Eastern combination will be in harmony with the United States Steel Corporation, it will not be controlled by it. Probably only three mills will be kept in operation; the fourth, not being in a position to work economically, is expected to be closed indefinitely. The active mills will be the two at Coatesville and the Central at Harrisburg. Prices remain as follows for Philadelphia and nearby deliveries: Universals, 1.75c. to 1.80c.; Sheared, 1.75c. to 1.80c.; Flange, 1.85c. to 1.95c.; Fire Box, 1.95c. to 2.05c.; Marine, 1.95c. to 2.05c.; C. H. No. 1 Iron, 2.40c.; C. H. No. 1 Flange, 2.90c.; C. H. No. 1 Flange Fire Box, 2.40c.

Structural Material.—There is no change in this department, and so far as can be seen there is not likely to be for some time to come. Deliveries are hard to secure within reasonable time, and in some cases premiums are paid to secure shipments before the end of the year. Prices nominally as follows for seaboard or nearby deliveries: Angles, 1.75c. to 1.85c.; Beams and Channels, 15-inch and upward, 1.75c. to 1.85c.

Bars.—There is a very fair amount of business being done, but some of the mills could do more if the business could be had. The pool agreement is very satisfactory, however, and as there is nothing to be gained by cutting prices they are firmly maintained as agreed upon some time ago. Steel Bars are scarce at 1.70c. to 1.75c., Iron Bars at 1.62½c. to 1.67½c.

Sheets.—Continued activity is reported in this branch of business, and prices are very firm as follows for Best Sheets (Common Sheets two-tenths less): No. 10, 2.50c.; No. 14, 2.70c.; No. 16, 2.70c. to 2.80c.; Nos. 18-20, 3.40c.; Nos. 21-24, 3.50c.; Nos. 26, 27, 3.75c. to 3.90c.; No. 28, 4.25c. to 4.40c.

Old Material.—There is a pretty good demand, but no distinct change in prices, although they are steady and possibly a shade higher in some cases. Bids and offers for deliveries in buyers' yards are as follows: Low Phosphorus Scrap, $21 to $22; Choice Railroad Scrap, $19.50 to $20.50; Country Scrap, $16 to $17; No. 2 Light (Ordinary), $12.50 to $12.75; No. 2 Light (Forge), $14 to $14.75; Machinery Cast, $14 to $14.50; Heavy Steel, $17.25 to $17.50; Old Steel Rails, $17.25 to $17.50; Old Iron Rails, $21.50 to $22; Wrought Turnings, $12.50 to $13; Cast Borings, $8 to $8.25; Old Car Wheels, $16 to $16.50; Iron Axles, $24 to $25; Steel Axles, $19 to $20.

Cincinnati.

FIFTH AND MAIN STS., November 20, 1901.—(*By Telegraph.*)

There has been but one move of importance in the Pig Iron market the past week, and that was the advancing of all grades of Southern Iron 50c. per ton. In the present condition of the trade there is no question in regard to buyers paying the advance without much objection, and it is considered a very conservative move by most sellers. Some few furnaces had been asking higher prices for a week prior to the raise of last Friday, and they especially are pleased with the move. All that has been said in recent letters regarding general conditions can be reaffirmed to-day. With the exception of the scarcity of cars there is very little to complain of; buying has been moderately fair and there is a pressing demand for Iron, especially No. 4 and Mill Irons, for quick shipment. Freight from Birmingham is $2.75 to this point; from Hanging Rock district $1.10. We quote, f.o.b. Cincinnati:

Southern Coke, No. 1	....	to	$15.00
Southern Coke, No. 2	....	to	14.25
Southern Coke, No. 3	....	to	13.75
Southern Coke, No. 4	....	to	13.25
Southern Coke, No. 1 Soft	....	to	15.00
Southern Coke, No. 2 Soft	....	to	14.25
Southern Coke, Gray Forged	....	to	13.25
Southern Coke, Mottled	....	to	13.25
Ohio Silvery, No. 1	$15.35	to	15.85
Ohio Silvery, No. 2	14.85	to	15.35
Lake Superior Coke, No. 1	15.35	to	15.85
Lake Superior Coke, No. 2	14.85	to	15.35
Lake Superior Coke, No. 3	14.35	to	14.85
Southern Basic	....	to	14.75

Car Wheel and Malleable Irons.

Standard Southern Car Wheel, chilling grades	$18.25	to	$18.75
Standard Southern Car Wheel, No. 2	17.25	to	17.25
Lake Superior Car Wheel and Malleable	18.50	to	19.00

Plates and Bars.—The market has hardly the strength it showed a few weeks ago and trade has been a little quieter. Prices are at least nominally the same. Iron Bars have been placed on the same basis as Steel Bars and are quoted f.o.b. Cincinnati as follows: Iron Bars in carload lots, 1.60c. to 1.65c., with half extras; same in small lots, 1.65c. to 1.80c., with full extras. Steel Bars are same price as Iron Bars. Base Angles, in carload lots, 1.90c.; Plates, ¼-inch and heavier, 1.90c. to 2c.; 3-16 inch, 2.10c.; Sheets, No. 16, 2.90c. to 3c.

Birmingham.

BIRMINGHAM, ALA., November 18, 1901.

These letters have of late represented the Iron market as being strong, with a hardening tendency and the probability of an advance in price was foreshadowed. It has come. All during the week there was practically an advance of 25c. per ton without there being any concert of action. But on Friday of the past week it was determined to advance public quotations 50c. per ton, which placed the market on the basis of $11.50 for No. 2 Foundry, except in the case of Gray Forge, which because of its scarcity and an active demand for it was advanced 75c. per ton. Revised quotations, therefore, are as follows: Gray Forge, $10.75; No. 4, $10.75; No. 3, $11, and No. 2 Foundry, $11.50. No. 1 Foundry is $12.50. The Softs are respectively $12.50 and $11.50.

No sales of Basic are reported, and purchases for delivery not remote would be difficult. Quotations for this grade are eccentric, and there is no rule one can follow with confidence in quoting it. It is sometimes at the same price as Gray Forge, and often it is readily taken at the same price as No. 2 Foundry. The demand has been steady and continuous, and there has been more trouble in obtaining the Iron than in fixing an acceptable price.

Some interests, regarding market conditions as abnormal, have held out, waiting for a decline. The advance made some of them apply to be taken in at figures they had declined. In some cases opposition to price ceased, and buyers took their medicine and gulped down the advance. One of these interests took 3000 tons at the advance. "Circumstances alter cases." The influence of the advance on demand creates no anxiety here, because, as these letters have so frequently stated, the output is so well sold up, extending through the first half of 1902. Except in special cases nearby deliveries cannot be obtained. The buying is not confined to any one line. It covers both Mill and Forge grades. Neither is it confined to any one district. It is general. One healthy sign is very apparent, and that is all the buyers are melters of Iron. There is an entire absence of speculative features. Speculators are not in it. It is the trade, and the trade only who are buying.

Shipments are still delayed by the difficulty in obtaining cars. There seemed to be a rift in the clouds last week in this respect, but it was only temporary. We are back again to the growing point, and complaints are plentiful. There is no remedy for it until the crush of business is eased up. In this district the number of cars handled in October by the Car Service Association exceeds by about 8000 the number handled in October, 1900. This is about as good a barometer of business conditions as one can consult. Work has commenced on the ten-story office building to secure a desirable foundation. The fact that outside capital has confidence enough in Birmingham to risk investments for profit has added faith to the value of Birmingham dirt, and "we ought to have" is superseded by "we must have." The new City Hall is now about roofed, and local pride is gratified to reflect that few cities can boast of a municipal home so solid, in such good taste and of such fine appearance. Improvements, combining solidity and elegance, are the order of to-day. If such are evidences of prosperity this city is a shining light.

Mention was made a short time back of exploration of incipient oil fields, some of which were located in this district. Though investigation has been unceasing, no practical profitable results have yet been obtained. But that confidence in results is strong is shown

by the fact that several companies are in process of formation, having both capital and experience to sustain and guide them. It need not, therefore, be a matter of surprise if in the near future "Alabama Gushers" become the subject in ordinary conversation. One of the *on dits* here in well posted circles is that all the important changes in high places in certain corporations have not yet materialized. A surprise is hatching.

Pittsburgh.

HAMILTON BUILDING, November 20, 1901.—(*By Telegraph.*)

Pig Iron.—The United States Steel Corporation closed up the purchase last week of about 40,000 tons of Standard Bessemer Iron from the Bessemer Furnace Association at the regular fixed price of $15.25, at Valley furnace, or $16, Pittsburgh, and for December shipment it is not unlikely the Corporation will buy a round lot of Bessemer Iron—100,000 tons or more—for the first quarter delivery, and at the above price. The furnaces would be willing to sell the Corporation any amount of Iron they might want to buy, and for next years' shipment, at $15.25. There has been some talk of an advance over this price, but it will hardly be made, as it is conservative, and at the same time allows a good profit to the furnaceman. It is a fact, however, that small lots of Bessemer Iron for spot shipment have sold up to $15.35 and $15.50, at furnace. It is also claimed that Chilled Basic Iron has been sold at a price equal to $15.75, at Valley furnaces. The Bessemer Iron market is as strong as it possibly could be, but an effort will be made to hold prices about where they are. Gray Forge is firm, and the American Steel Hoop Company have been heavy purchasers for their mills at Duncansville, Pa., and also in the Youngstown district. Foundry Iron is also in active demand and prices are very strong. We quote: Standard Bessemer Iron, $15.25, at furnace, in large lots, and from 10c. to 25c. advance for small lots, and spot shipment from an Eastern Steel concern is reported to have brought a round lot of Bessemer Iron in the Valley district. This is the first time this has occurred for several years, and shows a great scarcity of Iron in the East. We quote Northern brands of Forge Iron at $13.75, at Valley furnace, or $14.50, Pittsburgh. We note sales of fully 10,000 tons at this price. No. 2 Foundry Iron is $15.25 to $15.50, and No. 1, $15.75 to $16, Pittsburgh. We note a sale of 1000 tons of No. 2 Foundry Iron, for shipment over the next four months, at a price equal to about $15.15, Pittsburgh.

Billets.—The supply of Billets for prompt shipment sems to be slightly better, and we quote at $27 to $27.50, maker's mill, for prompt delivery. The blooming mill of the Republic Iron & Steel Company, Youngstown, is off on account of an accident, and the concern are casting Ingots and shipping them to the Ohio works of the National Steel Company to be bloomed. Records for output in all the Steel plans were made in October, which will likely stand for a long time.

(*By Mail.*)

The situation in the Iron trade is quiet, as far as new developments are concerned, but the amount of tonnage being placed with the mills is heavy, and it is a puzzle to every one in the trade where it all goes. October was a record breaker for production of Pig Iron, Stel and Finished Material, and yet the mills are apparently as far behind as ever in deliveries, and demand keeps up with surprising steadiness. J. P. Morgan is reported to have made the statement that "The good times have only commenced." Mr. Morgan is usually well informed on any matter to which he gives public utterance, and, if he is right in this, the Iron trade, and all other trades as well, are in for a long siege of prosperity. The United States Steel Corporation bought last week from the Bessemer Furnace Association about 40,000 tons of Bessemer Iron for December shipment, to fill in at the different works. This was at the regular price of $15.25, at Valley furnace. Small lots of Bessemer Iron for prompt shipment are bringing from 15c. to 25c. a ton more, and Chilled Basic Metal for prompt shipment is said to have sold at $15.70, Valley furnace. As we have stated before, Pig Iron seems to be the strongest part of the whole Iron trade. Steel for prompt shipment seems to be in a little more plentiful supply and prices are slightly easier. Finished Material is unchanged throughout, but we note a continued heavy demand, and the tone of the market is very strong. The condition of the financial institutions of the country was never more prosperous than at the present time. The Bankers' and Bank Clerks' Mutual Benefit Association held its annual meeting in this city Monday night, and the chief address was made by Henry P. Bope, first vice-president and general manager of sales of the Carnegie Steel Company. Mr. Bope's address teemed with good things, and we reproduce it in full elsewhere in this issue. It will bear very careful reading. The car shortage, which is an old subject, is easing up somewhat, and the supply of cars is better, but is still far short of being large enough to move the tremendous tonnage of Iron and Steel products, and, in fact, all kinds of merchandise, that is being offered to the railroads. As an instance of the congested condition existing among some of the mills, we can state that on one day recently a local Steel concern had over 500 cars loaded in their yards ready for shipment, but which the railroads were unable to move. On Sunday last the Pittsburgh & Lake Erie Railroad moved 12,000 loaded cars, which is said to be the record for one day's work. It is thought the situation will steadily improve from this time forward, and the heavy orders for cars being placed by Pennsylvania, Baltimore & Ohio and other roads indicate that another serious car shortage like the present one will hardly occur again. The heavy orders also being placed for Engines, Rails and other railroad equipment bear out this statement.

Rails.—Up to November 1 about 1,100,000 tons of new orders for Rails had been placed, and this month quite a good deal more tonnage has been given to the mills. There seems to be no doubt but that the Rail mills will enter the new year with more than 1,500,000 tons of old and new orders on their books. The Rail output this year will amount to about 2,700,000 tons, but for 1902 may not be quite as heavy as this. One leading Rail mill will be out of the market, and there is no doubt whatever but that the rest of the Rail mills will have all the tonnage they can take care of throughout the whole of next year. There will be no change in the price of Rails for a good while, at least, and we quote $28, at mill, on Standard Sections.

Ferromanganese.—We continue to quote domestic Ferro at $52.50 to $53.50 in gross tons, delivered at buyer's mill. Foreign Ferro continues to be offered in this market at somewhat lower prices, and could probably be bought at $50 a ton in large lots and on contracts.

Rods.—There have been heavy sales of Rods in the past two weeks, and the market is very firm. We quote Bessemer Rods at $33, maker's mill.

Muck Bar.—The market is firm, and there is a good deal of inquiry. We continue to quote Standard grades of Muck Bar at $29.50 to $29.75, but some sellers are holding firmly for the higher price. We note a sale of 1500 tons of Muck Bar at $29.50, delivered buyer's mill at Pittsburgh.

Structural Material.—A good deal of tonnage is being figured on, but is not yet in shape to be placed. The Farmers' Deposit Bank, about 5000 tons, is about ready, and will likely be given out in a few days. Some great records for production were made in the Structural mills of the Carnegie Steel Company and Jones & Laughlins in October. There is a steady stream of small orders, and the mills are well filled up for the next two or three months. It is expected that the total business in all kinds of Structural Shapes this year will exceed 600,000 tons. There is no change in prices, and we quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6 inches, 1.60c.; smaller sizes, 1.55c. to 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.50c., half extras, at mill; Universal and Sheared Plates, 1.60c. All above prices are f.o.b. Pittsburgh.

Spelter.—There is no change in the market, and we quote best Western grades at 4.20c., Pittsburgh.

Plates.—Report has it that the consolidation of the Plate Mills of the Central Iron & Steel Company, Tidewater Steel Company, Lukens Iron & Steel Company and Worth Brothers, all in the East, is an outright purchase by Charles M. Schwab and some of his associates in the United States Steel Corporation. It is said to be the intention to consolidate these four mills with the Bethlehem Steel Company, already owned by C. M. Schwab and other officials of the United States Steel Corporation, and eventually to take in William Cramp & Sons Shipbuilding Company in Philadelphia and the New York Shipbuilding Company. The consolidation of the interests of these seven enterprises would make a very powerful company, and it seems would be of mutual interest. Eventually, if such a consolidation is made, it may be taken over by the Steel Corporation. Tonnage in Plates does not show much improvement, and some of the mills are working from hand to mouth. Two or three of the larger Plate mills are pretty comfortably fixed, but there is not enough Plate business to go around. The placing of heavy orders for cars by Pennsylvania and Baltimore & Ohio railroads means that early in the year heavy orders for Plates will be placed, and the general situation in this trade ought to show a good deal of betterment before 1902 is very old. The Pennsylvania order alone for 19,000 cars would require from 150,000 to 175,000 tons of Plates and Small Shapes. There is no change in prices. We quote: Tank Plate, ¼ inch thick, up to 100 inches in width, 1.60c. at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.80c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, $1 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms, net cash in 30 days.

Iron and Steel Bars.—Mills rolling Bars are extremely busy, but new tonnage coming in is not as heavy as some time ago. It is claimed that recent irregularities in established prices of Iron Bars in the West have disappeared. Now that orders for so many thousands of cars have been placed, there ought to be a very heavy demand from the car people for Bars before long. We quote Steel Bars at 1.50c. at mill, half extras, with $2 a ton advance for open hearth stock and the usual advances for Special Shapes. We quote Iron Bars at 1.55c., Pittsburgh, for Eastern shipment, and 1.50c. for Western shipment.

Sheets.—Mills have pretty well caught up with back orders, and reasonably prompt shipments are being made. It is said that negotiations are under way looking to the further importation of foreign Sheets. There is quite a heavy demand for Galvanized Sheets, and the market is strong. Prices in carloads are as follows: Nos. 10, 11 and 12, 2.40c.; Nos. 14 and 15, 2.50c.; Nos. 16 and 17, 2.60c.; Nos. 18 to 21 inclusive, 2.70c.; Nos. 22, 23 and 24, 2.80c.; Nos. 25 and 26, 2.90c.; No. 27, 3c.; No. 28, 3.10c.; No. 29, 3.25c.; No. 30, 3.35c. For small lots of a few bundles of Sheets and for prompt shipment No. 27 brings from 3.15c. to 3.25c., and No. 28, 3.25c. to 3.35c. We quote Galvanized Sheets at 70 and 5 off in carloads, maker's mill, and 70 off in small lots.

Merchant Steel.—Mills report a good demand, which, with old contracts, will keep them well filled up through the winter. Prices are firm, except on Shafting, on which low prices continue to be made for desirable orders. We quote: Tire Steel, best quality, 1.70c.; Toe Calk, 1.80c. to 1.85c.; Hammered Lay Steel, 3.50c.; Open Hearth Spring, 2.50c. to 2.75c.; Steel Bars, 1.50c., base, in carloads, and 1.60c. in small lots; ordinary Plow Slabs up to 6 inches wide, 2.25c.; over 6 inches wide, 2.40c. For ordinary orders we quote Cold Rolled and Cold Drawn Shafting at 60 per cent. off in carloads and 55 per cent. off in less than carloads, delivered at all points east of the Mississippi River. We quote Tool Steel at 6c. and upward, depending on quality.

Merchant Pipe.—Demand has fallen off to some extent, as it usually does at this season of the year, but the larger Tube mills are well filled up for several months ahead. Some of the smaller mills are naming lower prices than for some time. We quote to consumers:

Merchant Pipe.

	Per cent. Black.	Per cent. Galvd.
⅛ to ½ inch and 11 to 12 inch	61	48
¾ to 10 inch	68½	56

Casing, Random Lengths.

	S. & S.	I. J.
2 to 3 inch	58	53½
3½ to 4 inch	63	59
4½ to 12½ inch	65	61½

Casing, Cut Lengths.

	S. & S.	I. J.
2 to 3 inch	53½	59
3½ to 4 inch	59	55
4½ to 12½ inch	61½	57½

Boiler Tubes.—We note a very heavy demand for Boiler Tubes, and the mills are from two to three months behind on contracts. Locomotive shops all over the country are full of work and are using more Tubes than ever before. Prices to consumers are as follows:

Boiler Tubes.	Up to 22 feet.
Steel.	Per cent.
1 inch to 1¾ inch and 2¾ inch to 5 inch, inclusive	65½
2 inch to 2½ inch, inclusive	60
6 inch and larger	59
Iron.	
1 inch to 1½ inch and 2½ inch	43½
1¾ to 2¼ inch	43
2¾ to 13 inch	53

To the jobbing trade the mills quote slightly lower prices than are given above.

Skelp.—Several large inquiries for Skelp are in the market, mostly from new Tube mills that are starting up. We quote Grooved Steel Skelp at 1.75c., Grooved Iron Skelp at 1.80c. and Sheared at 1.85c., f.o.b. maker's mill, less 2 per cent. for cash in 30 days from date of shipment.

Iron and Steel Scrap.—It is reported that the Eastern Bar Iron Association is about to establish a central purchasing agency, which will make all the purchases of Scrap needed by the mills in the association. It is understood that each mill in the above named association is to report its requirements for one month in advance and the orders will be distributed by the purchasing agency, so as to prevent one buyer bidding up the market against another. This plan has stirred up the dealers in Old Material, and it is said they are endeavoring to form a combination for the purpose of offsetting the operations of the consumers' combine. We note a large demand for Heavy Melting Stock, which is bringing from $18 to $18.50 per gross ton. No. 1 Wrought Scrap is $16 to $16.50 net ton and Cast Scrap $11.50 to $12 gross ton. Low Phosphorus Melting Stock is very firm, and is held at $19.50 to $20 gross ton.

Coke.—Blast furnaces in the Pittsburgh and Valley districts are still suffering for want of Coke, but the supply seems to be somewhat better and it is probable the worst of the trouble is over. Motive power was greatly damaged by the fact that water in the streams was very low and for this reason was highly charged with sulphur, which ate out the boilers very fast and necessitated putting engines in the shops for repairs. Some contracts for Furnace Coke have been made for next year and the outlook is that high prices will rule during the first six months at least, and probably through the entire year. This year has been a very satisfactory one in the Coke trade, prices being profitable and demand for Coke large through the whole year. There has been also an entire absence of labor troubles in the region. At the present time 19,902 ovens in the Connellsville region are active and 1931 idle. The output last week was 236,376 tons and shipments 10,273 cars. We quote strictly Connellsville Furnace Coke at $1.85 to $2, and contracts for first half of next year have been made with some of the Valley furnaces at the higher price. We quote 72-hour Foundry Coke at $2.25 to $2.50, but are advised that most of the business is at the last figure. We quote Main Line Furnace Coke at $1.65 to $1.75 and Foundry at $1.85 to $2, all in net tons at oven.

Cleveland.

CLEVELAND, OHIO, November 19, 1901.

The season of navigation is drawing rapidly to a close and with it comes an increasingly strong market as to the transportation of Iron Ore. There is a contest on between the Ore and the grain shippers for tonnage, the rate paid by the shippers of one commodity suggesting the rate at which the other shall be carried. Duluth has been paying $1.25 on Ore to Ohio ports, but within the last few days grain shippers have paid the equivalent of $1.50 on Ore and now the boat owners are withholding their vessels from the Ore trade until better than the old rate is paid. Very little business has developed out of Escanaba or Marquette, although during the week a few charters have been made from the former port at 85c., which is an advance over former rates. Marquette so far has paid nothing better than $1.15, at which a contract was closed recently. The amount of wild Ore to be brought down the lakes is comparatively small, although some of the boats will be kept busy with it until the lakes have frozen up. While the amount is not large, the shippers are forced to pay about the rate that is demanded by the vessel owners. Those who care to make predictions are looking for a $2 rate from Duluth to Ohio before the season is over. The contract season is about at an end, and some of the owners who had taken large blocks to move have found that they are short of their requirements.

Pig Iron.—The demand keeps up, with the supply declining steadily. The result, in a general way, is a very strong market. In the Foundry grades the producers are hampered still by the lack of Coke, which permits only a portion of the furnaces to be engaged at any one time, the result being that 12 furnaces in the Valleys are out of blast all the while. This, together with the fact that before the shortage of Coke appeared the furnaces were sold up to the first of the year, makes a very strong market and a state of affairs that is not relished by the furnacemen. To this annoyance is added that other one of being unable, through the shortage of cars, to deliver the material when it has been produced. Under these circumstances the market has become very strong, and it might be said that No. 2 Foundry is quoted at $14.50 as the minimum in the Valley. At this price sales have been made which completely take up the available material up to January 1, and also cover a great part of the production of the same furnaces for the first half of next year. The trade here has been apprised of a further advance in Southern Foundry, No. 2 being quoted at $11.50 in Birmingham, to which is added the $4.70 freight rate to make up the Cleveland quotation. The market has also learned that the United States Steel Corporation are a possible buyer of a large quantity of Bessemer and Basic Iron for the first quarter, with some prospects of the buying being extended to cover the first half. There is a decided uncertainty as to the price. It is assured that no less than $15.25 on Bessemer will be made, and the Bessemer Association is asking more. Some reports have had it that some small sales have been made at $15.25. On Basic the furnaces are asking $15, but the determination to maintain a certain differential between Bessemer and Basic may force that price back to $14.50. The continued idleness of the furnaces is assisting the producers in their contention for better prices.

Finished Material.—The market is still strong and the demand for material is such that several grades are not offered for sale, while deliveries on all grades are naturally slow. In the matter of Rails the report has been made this week that from this territory orders have been taken which entail deliveries into the fourth quarter of next year. The price is holding up well and some of the mills are finding that they are getting a little ahead of their capacity on contracts accepted. In Structural Material the orders have been coming in to an extent that would warrant the assertion that the business is now as brisk as it has been at any time during the past season, a remarkable indication when it is recalled that the dull season of the trade is about to set in. Sales have been so heavy that no promises of delivery are made before the first or the middle of February. The contracting for delivery during the first quarter of next year has continued and quite a good sized tonnage has been placed. In the Plate business the trade is picking up some, so that it may now be said that about all appearances of weakness have disappeared. The crying need of railroad equipment has stimulated the demand for material which is used in its production. The shipbuilders are also asking for Plates, as several new ship orders have been taken and others are coming. The price holds firm at 1.70c. The market is so strong on Billets, Sheet Bars and Slabs that in many instances the mills are not promising to make deliveries before the present contracts expire, and these take up the prospective output of the mills until July 1. The mill men are not making quotations on these articles for immediate delivery. Bars are a little stronger than they were. The price has not changed, but it is apparent that the sales are gaining on the producing capacity. While the new mill of the Carnegie Company is still making great inroads on the business to be done, yet the increased demand presenting itself is giving the market a new strength. The prices do not change from 1.50c., Pittsburgh, for Bessemer Steel and Iron Bars, and 1.60c., Pittsburgh, for Open Hearth Steel Bars. Sheets are strong, being in big demand upon the market, with prices holding well up.

Old Material.—The trade in Scrap has increased a little during the week and some of the easier conditions have disappeared. This is due in part to some buying on the part of the Republic Iron & Steel Company and also to the sales to a Youngstown Steel company who have but recently come into the market. The only effect of this buying was to reaffirm the market in the prices which have been heretofore quoted and from which there was some disposition to recede. The quotations are as follows: No. 1 Wrought, $16.50 net; Cast Borings, $8 gross; Wrought Turnings, $12.25 gross; Cast Scrap, $13 net; Stove Plate, $10 net; Heavy Steel, $17 gross; Steel Rails, $17; Old Iron Rails, $22 gross; Old Iron Axles, $19 gross; Old Car Wheels, $17 gross.

New York.

NEW YORK, November 20, 1901.

Pig Iron.—Trade is active, in fact, exceedingly active for the season. Stocks continue to shrink under the heavy demand, and prices are strong with an advancing tendency. The Southern furnace companies have marked up their prices 50c. per ton on all grades and Northern makers are strongly inclined to take similar action. We quote: No. 1, $16 to $17.50; No. 2 X, $15.15 to $15.75; No. 2 Plain, $14.65 to $15; Gray Forge, $14 to $14.50; Tennessee and Alabama brands, No. 1 Foundry, $16; No. 2 Foundry, $15.25; No. 1 Soft, $16; No. 2 Soft, $15.25; No. 3 Foundry, $14.75; No. 4 Foundry, $14.25; Gray Forge, $14.25.

Cast Iron Pipe.—Business is still coming in, notwithstanding the lateness of the season. Inquiries are steadily being received for supplies for next year. The indications are strongly in favor of higher prices in sympathy with the strength shown in Pig Iron. The large Boston contract was last week awarded to the United States Cast Iron Pipe & Foundry Company, the price named on the 60-inch being $27.70 per net ton, and on the 48-inch, $23.87 per net ton. It is understood that the contract for the Pipe for New York City was secured by an independent company. Quotations are continued at $26 to $27, gross ton, tidewater.

Steel Rails.—The demand is so steady and the mills are so rapidly filling up with work for next year that it now seems quite likely that some of the railroad companies who will then need Rails will find considerable difficulty in securing a supply. Standard Sections are continued at $28, Eastern mill.

Finished Iron and Steel.—The situation is strong in all forms of Finished Iron and Steel, but particularly in Structural Material. The amount of business offering in this line is beyond precedent for this time of the year. Railroad work is coming in freely, and the bridge companies are operating their works to full capacity.

The only uneasiness they express is with regard to an adequate supply of material for their requirements. The largest contract closed the past week was the train shed for the new Lake Shore & Rock Island Depot for Chicago, which will require about 10,000 tons, but this can hardly be considered new business, having been previously referred to. This contract was secured by the American Bridge Company. An advance has been made in the price of Charcoal Iron Plates. Prices are quoted as follows at tidewater: Beams, Channels and Zees, 1.75c. to 1.80c.; Angles, 1.75c. to 1.80c.; Tees, 1.80c. to 1.85c.; Bulb Angles and Deck Beams, 2c.; Sheared Steel Plates are 1.80c. to 1.85c. for Tank, 1.90c. to 1.95c. for Flange, 2c. to 2.05c. for Fire Box. Charcoal Iron Plates are held at 2.40c. for C. H. No. 1, 2.90c. for Flange, and 3.40c. for Fire Box. Refined Bars are 1.60c. to 1.65c.; Soft Steel Bars, 1.62½c. to 1.65c.

Metal Market.

NEW YORK, November 20, 1901.

Pig Tin.—Since our last writing a regular corner in spot Tin was inaugurated by large interests in this city. The plan, it seems, was formulated about a month ago. Spot Tin was kept here below London parity until about ten days ago in order to prevent shipments from London and to enable shipments from here to the Continent. In that way the stock and the greater part of the shipments which can come in now were concentrated in one hand. It is now in the power of the controlling factor to dictate prices for spot delivery. Following on this plan the price of spot has been jacked up to 27c. to 28c., while November delivery sold at the same time at 26¼c. to 26.40c., and delivery out of steamers due at 26c. The London market was not much affected by the manipulation here. Prices for spot there show an advance of only ½ point for the week. Spot closed here to-day dull and nominal at 27c. to 28c. There was no trading in futures. London is quoted £113 12s. 6d. for spot and £108 5s. for futures.

Copper.—Nothing has developed to actually change the general situation. Lake is held at 16.85c. to 17c. Electrolytic is unchanged at 16.30c. to 16⅝c., and casting stock remains unchanged at 15⅝c. to 16⅜c., according to brand. The price of 17c., set by the Waclark Wire Company last week, is not accepted as the market figure by the balance of the trade. It is said that this company have for some time been selling Copper Wire below the regular market rates, this being possible through their connection with the Verde mines in the matter of raw material. The market price, it is said, has for some time been below 18¾c. There have been daily reports of the cutting of the price of Copper circulated at a time when it was thought they would have the desired effect upon the Copper share market. The fact is that prices have not changed. It is still a waiting game on both sides. The one feature of interest of the week was the report of the October production. It was generally expected that a marked falling off of output would be shown, as it was known that a large number of Montana mines were restricted through litigation. The restriction of production ordered by the Amalgamated Company, it was thought, would also have a similar effect. Instead of this being the case, however, October showed in the total an increase of over 10 per cent. over September, and in fact the largest monthly production on record. The heavy increase came from the new producing mines. The European statistics on the 15th were also a surprise. The decrease of stocks for the fortnight amounted to only 220 tons. This, in the face of our small exports and the constant shipment of Copper to this country, caused surprise. It is held as an indication that European consumption is still on the decrease, and the outlook for the near future in Europe is held to be anything but bright. Exports thus far this month amount to only about 3600 tons, while imports aggregate 2200 tons. This leaves the net exports for the three weeks at about 1400 tons. At the close to-day the London Copper cable named £66 15s. for spot and £65 15s. for futures. Best Selected advanced to £73 5s.

Pig Lead—Is entirely unchanged. The American Smelting & Refining Company still quote 4.37½c. for Desilverized, f.o.b. New York, and 4.32½c., St. Louis. London declined to £11 2s. 6d., but has since revived to £11 6s. 3d.

Spelter.—In another column details are printed of the proposed consolidation of Zinc smelters. As this matter has been successfully concealed thus far no effect has been felt in the market as yet. Business is quiet at 4.30c. here and 4.10c. to 4.15c., St. Louis. London is unchanged at £16 12s. 6d.

Antimony—Is unchanged. Hallett's is quoted 8⅜c. Cookson's is unchanged, being held nominally at 10¼c. Outside brands declined to 8c. to 8¼c.

Nickel—Is unchanged, prices continuing on a basis of 60c. for lots not covered by yearly contracts.

Quicksilver.—There is no change here. The price is $51 per flask of 76½ lbs., in lots of 50 flasks and more. London has declined 2 shillings 6 pence, to £8 17s. 6d.

Tin Plates.—The situation is unchanged. The American Tin Plate Company are selling only for the first quarter of next year on a basis of $4.19 per box of standard 100-lb. Cokes, f.o.b. New York, and $4, f.o.b. mills.

John Stanton reports the copper production in the United States and of the foreign reporting mines and United States exports as follows, in gross tons of 2240 lbs.:

	Reporting mines.	Outside sources.	Total U.S. product.	Product foreign mines.	U. S. exports.
First half 1895.....	70,612	9,100	79,712	42,484	34,215
Second half 1895...	84,885	6,600	91,485	43,674	30,507
Total 1895.....	155,497	15,700	171,197	86,178	64,722
First half 1896.....	94,180	7,200	101,380	42,255	58,216
Second half 1896...	95,314	7,200	102,514	43,941	67,287
Total 1896.....	199,494	14,400	203,894	86,196	125,503
First half 1897.....	103,651	5,000	108,651	44,263	64,870
Second half 1897...	100,555	6,900	107,455	44,007	64,340
Total 1897.....	204,206	11,900	216,106	88,270	129,210
First half 1898.....	112,687	7,800	120,487	40,880	68,284
Second half 1898...	103,535	10,250	113,785	43,674	76,831
Total 1898.....	216,222	18,050	234,272	84,554	145,115
First half 1899.....	111,987	12,500	124,487	43,629	56,460
Second half 1899...	118,818	18,900	137,719	45,611	63,351
Total 1899.....	230,806	31,400	262,206	89,240	119,811
First half 1900.....	114,177	20,400	134,577	43,153	90,747
Second half 1900...	113,810	20,400	134,104	46,278	69,335
Total 1900.....	227,987	40,800	268,681	89,431	160,082
First half 1901.....	112,794	20,600	133,394	46,847	50,027
July, 1901.....	18,585	3,400	21,985	9,254	6,824
August, 1901.....	19,267	3,400	22,667	8,180	6,840
September, 1901....	18,080	3,500	21,580	9,477	6,419
October, 1901.....	20,498	3,600	24,098	8,960	8,016

The Steel Wheel & Wagon Company's Improvements.—The Steel Wheel & Wagon Company, Pueblo, Col., advise us that they are in the market for the entire equipment for their new plant, consisting of hydraulic and saw presses, gang punches and riveters for making their pressed steel wagon bed, bulldozers, punches, drills, tire benders, hydraulic tilt, setters, &c. The company have purchased a tract of 10 acres of land adjoining the Minnequa steel plant and are now excavating for a building, 96 x 300 feet, which will be as nearly fire proof as possible. The contract for the steel work has been let to the Garry Iron & Steel Company of Cleveland, Ohio. There will also be an office building, storage building, &c., and side tracks will connect the plant with all railroads entering the city. The power plant will consist of one 100 horse-power engine and one 150 horse-power boiler. The company are considering and will likely adopt electric power drive with alternating current. They will make a specialty of manufacturing an all steel wagon which will be practically water tight, for use of ranchmen and freighters. The capacity will be from 5000 to 10,000 wagons per year, and an equivalent amount of other work, consisting of mining and shop cars, barrows, steel rollers, &c., will be turned out. W. H. Schofield is president and general manager; Geo. W. Bowen, vice-president; S. I. Heyn, secretary, and H. T. Wright, treasurer.

At Pittsburgh the American Bridge Company, the Canton Steel Company, the Brooks Locomotive Company and the Philadelphia Company filed a petition in bankruptcy against the Kane-Maloney Iron & Steel Company of that city. The plaintiffs claim the defendant on August 28, 1901, made an assignment of certain claims to give preference.

The New York Machinery Market.

NEW YORK, November 20, 1901.

General conditions in the machinery trade continue to improve. In all branches of the trade there is more comment regarding extensive projects under way than have been heard for many weeks past. The balance of opinion is decidedly optimistic. Ordinary small business keeps up in good volume and occasionally a job is closed placing deliveries further distant in the particular line affected. During the last week or two enough work has been estimated on to set at rest all feeling of uneasiness that may have shown itself in any of the engineering branches. One feature of this inquiry that is universally commented on is that it comes from well known and reliable sources. Consequently it is expected soon to bear fruit. The amount of work that is waiting to be closed is now simply enormous. In hope of settling some of this a number of larger firms have arranged special trips for their salesmen. This measure, it is believed, will prove effectual, so near are these projects to the closing point. The principal object is to add to the already magnificent showing of this year. One well-known representative of a power plant specialty concern in this city is doing this, stating that he has over $150,000 worth of business practically closed but not signed.

One of the chief reasons for the procrastination shown by purchasers is the change of plans. And in all cases the change is said to be in the right direction. In many instances the original proportions are being doubled in size.

There is a growing feeling of buoyancy manifest among builders of

Machine Tools.

A number of very good propositions are now before the large merchants in this city. One especially large job is alluded to as being about ripe, and the "street" is after it now.

The American Turret Lathe Works Company of Wilmington, Del., are in the market for a large amount of machinery. It is to be installed in a new plant which the company have had in consideration for some time.

The company have decided to locate in Warren, Pa., where they already have the survey of the site completed and the stakes set for their proposed new plant. The construction of the building will be commenced as soon as possible, the plans for which are well under way. They call for an erecting shop, 60 x 300 feet; fitting room, 30 x 150 feet; store room, 30 x 210 feet; wash room, 30 x 90 feet; machine shop, 150 x 210 feet; power house, 30 x 60 feet; forge shop, 30 x 60 feet; office and drafting room, 30 x 90 feet; pattern shop, 30 x 60 feet, and tool room, 30 x 150 feet. Each of the buildings will be of the saw tooth type, of steel and brick construction, and will be equipped with the latest and best modern machinery, which will include more than 125 machine tools; several special machines of original design, which will be built at their own works; a 5 and a 10 ton electric traveling crane, several smaller cranes and hoists, annealing and case hardening furnaces, hammers, &c. All of the furnaces will be operated by natural gas. The plant will have electrical transmission throughout. While the plans also provide for a foundry, its construction will be deferred until the machine shop is in complete working order. C. M. Conradson is president and general manager.

As soon as the specifications are completed the Berlin Construction Company, Berlin, Conn., will be in the market for the electrical equipment for the new bridge shops, which will be erected on 6 acres of ground recently purchased, opposite the power station. Almost all the other equipment has been bought. They expect to have the plant in operation by March. The orders for machine tools have been very extensive and were distributed among all of the principal builders and dealers in this section.

An extensive addition is being built to the plant of the A. S. Cameron Steam Pump Works, Brooklyn, N. Y. Purchases of machine tools are now being made. The building will be four stories high, the lower floor being devoted to heavy tools, the second and third floors to light machinery, and the fourth floor will be used for a pattern shop.

The Boston & Maine Railroad Company have been in the market for a large equipment of machine tools to be installed in a new repair shop to be erected at Keene, N. H. Most of the contracts have been closed.

The Kansas City, Mexico & Orient Railway Company, Kansas City, Mo., advise us that they are pushing work on the construction of the road as rapidly as possible, and are liable to be in the market almost any day now for the equipment for their shops, which will be located at Wichita, Kan.

Work has already been commenced on the new cylinder shop addition to the Brooks Works of the American Locomotive Company at Dunkirk, N. Y. The cylinder shop will be located near the foundry department. It will be 100 x 300 feet in dimensions. It is also understood that the American Locomotive Company people have purchased from the Erie Railroad the land near the locomotive plant which is bounded by Talcott street, the Roberts road and the D., A. V. & P. tracks. Another piece of land on the south side of the building has been secured from the same company. With this increased plot of ground a new machine and foundry shop will be erected. The new additions will be on an extensive scale. When asked how soon these new additions would be started, a prominent man who is connected with the company replied: "Plans are now ready and the work is only awaiting the perfection of our arrangements for digging the excavations."

Announcement is made that the directors of the Lanston Monotype Machine Company of Washington, D. C., and Philadelphia have decided to sell $600,000 treasury stock, to be used for the further development of the company's business. It is stated that all of the new stock has been taken by prominent interests in the company and a few outsiders. When this stock is issued it will make the company's total outstanding stock $4,800,000. This report brings with it a revival of the talk that the company are about to build extensive works for the manufacture of their machines. At present the machines are built under contract by William Sellers, Incorporated, of Philadelphia. It is also said that the company intend erecting a foreign plant. The machines are used in printing offices.

Plans for the new works to be built by the New Castle Forge & Belt Company at New Castle, Pa., have been prepared and the work of construction has started. The main building will be 60 x 208 feet, built of brick, and there will be several other smaller buildings. The concern will make bolts, rivets, chain and forgings, and expect to be running by the first of the year.

All contracts have been closed and purchases made for the changes the Harrison Safety Boiler Works, Philadelphia, Pa., are making to their plant. These consist of a one-third increased output in the foundry and a steel addition, 40 x 85 feet, to the erecting shop, doubling the capacity. The latter will be equipped with a 25-ton traveling crane. A number of new tools have also been purchased, so that the capacity all around will be largely increased.

Boilers, Engines and Accessories.

There is considerable activity in projected power plants of large horse-power. There is an increasing tendency in the direction of high tension, high speed electric railways connecting cities and important towns. As a prominent engineer said: "The cities seem to be pretty well taken care of; the present movement is to connect the cities and extend into outlying districts. In this manner the traction companies offer inducements to the overcrowded population of cities to settle in the suburban sections. When two cities of comparatively close proximity do this it is but another step to connect the cities. The next step is the consolidation of the lines and the adoption of high service systems."

It has been proved that the consolidation movement carries with it an extension of operations. The present movement in this direction is expected to prove no exception to this rule. In upper New York State, lower New England and the Philadelphia district activity in this respect is marked.

In accordance with the advance of the price of tubes

and plates the prices of boilers have been increased. In the line of water tube boilers the advance has approximately amounted to 5 per cent. Engine prices remain unchanged among the more important concerns, whose shops are well filled with work. Among other concerns, however, there is quite an extensive shading of prices being indulged in. The concessions are so great in some instances that the "big fellows" lose the business. The condition of their shops and the bright prospects of the near future permitted them to let the business pass by without any feeling of uneasiness.

The Peoria & Eastern Railway Company, Indianapolis, Ind., advise us that they will shortly be in the market for four large boilers for their new shops at Urbana, Ill., where they are to erect a car and paint shop, 120 x 320 feet; upholstering shop, 35 x 70 feet, and a paint storeroom, 24 x 40 feet. Other intended improvements are the erection of a three-stall addition to the roundhouse, and a mill room, 40 x 100 feet, at the Moorefield yards, Indianapolis. All these buildings are to be of brick, with steel roof trusses. They will also build a large transfer table and pit, the table to be run by electricity.

Specifications for the boiler plant to be installed by the Navy Department in the League Island Navy Yard have been increased from 2000 to 3000 horse-power.

Hooven, Owens & Rentschler of 39 Cortlandt street captured the engine contract awarded by the Rolling Mill Company of America of Connellsville, Pa. There are to be two rolling mill engines aggregating 1500 horse-power. Each will be 36 x 60 inches in size.

The Carnegie Steel Company's New Angle Mill.—We noted last week the fact that the Carnegie Steel Company would build a new angle mill adjacent to the Howard Axle Works, at West Homestead, Pa., to have a monthly capacity of 12,000 tons, and to make all sizes of angles from 3 x 3 inches up to 8 inches in size. When this new angle mill is finished it is the intention of the Carnegie Steel Company to remove the angle departments of the Upper and Lower Union mills, in Pittsburgh, to the new mill. The Carnegie Steel Company are so crowded with orders for angles that they have recently sublet some of their contracts to other mills. The main building for the new angle mill will be about 300 feet wide and 600 feet long. The plant will be operated on the direct process system, the steel billets being taken into one end of the mill, reheated, and then put through the various processes of rolling, and finished at the other end of the plant without rehandling at any stage of the rolling. The new plant will have modern equipment, including Cahall boilers, electrical machinery and gas engines. The building will be erected by the American Bridge Company.

A paragraph is going the rounds of the daily press stating that the American Bridge Company have just secured a contract for the construction of 20 steel bridges along the line of the Uganda Railroad in East Africa. This information is not new, as full particulars of this contract were reported long since in our columns. A great deal of the work of construction has been completed and the material shipped.

The forty-fourth meeting of the American Society of Mechanical Engineers will be held in the society's parlors, 12 West Thirty-first street, New York, December 3 to 6, 1901. Secretary F. R. Hutton has issued a programme covering the subjects which will be discussed and the papers which will be read at this meeting.

Charles M. Schwab, president of the United States Steel Corporation, has agreed to donate $50,000 toward the erection of a Y. M. C. A. building at Vandergrift, Pa., where the largest of the sheet plants of the American Sheet Steel Company is located.

At Pittsburgh, in the case of the Pittsburgh Supply Company against the Pittsburgh Meter Company, the Circuit Court found in favor of the plaintiff. This finding was reversed by the United States Circuit Court of Appeals, and the bill of the complainant was dismissed.

The Reciprocity Convention.

WASHINGTON, D. C., November 19, 1901.—The Reciprocity Convention, called at the instance of the National Association of Manufacturers, began its sessions in this city to-day, and will continue during the 20th and 21st instant. The opening day's work has been decidedly discouraging to those who have looked to this convention to formulate sentiment in favor of the pending reciprocity treaties. Throughout the three sessions, this morning, this afternoon and this evening, high protection utterances have been vigorously applauded, while appeals for reciprocity arrangements of any kind have been received in a silence that has seemed ominous. With the exception of the extended address with which the regular discussion opened, delivered by A. B. Farquhar, the well-known manufacturer of agricultural implements, and a short paper by George H. Barbour of the Michigan Stove Company, there were no unequivocal declarations in favor of reciprocity. Other delegates indicated their willingness to advocate reciprocity "so limited that under no circumstances could a single American industry be affected by any form of foreign competition." Such reciprocity must be limited absolutely to the reduction of duties on, or the free entry of, "articles which are not, and cannot be, produced in the United States." The few advocates of a broader reciprocity who were in evidence to-day declared that many more friends of the pending treaties would be heard from before the convention adjourns, but at this writing there is little reason to believe the convention will take any action favorable to these treaties.

The delegates present comprised, among others, representatives of the following organizations: Hardware Merchants' and Manufacturers' Association of Philadelphia, Manufacturers' Club of Philadelphia, National Association of Agricultural Implement and Vehicle Manufacturers, Home Market Club of Boston, National Association of Thrasher Manufacturers and Jobbers, New York Board of Trade and Transportation, Chamber of Commerce of the State of New York, Philadelphia Board of Trade, American Free Trade League of Boston, National Carriage Builders' Association, South Brooklyn Board of Trade, Boston Chamber of Commerce, Newark (N. J.) Board of Trade, Silk Association of America, National Association of Boot and Shoe Manufacturers, Reading (Pa.) Board of Trade, American Association of Glass Manufacturers, Manufacturers' Association of New York, Business Men's Club of Cincinnati, Manufacturers' Club of Cincinnati, Louisville (Ky.) Board of Trade, Merchants' and Manufacturers' Exchange of Detroit, Mich.; National Metal Trades Association, Lumberman's Exchange of Philadelphia, Pennsylvania Millers' State Association of Wilkes-Barre, the Trade League of Philadelphia, the Missouri Valley Lumberman's Association, National Association Knit Goods Manufacturers, Carriage Builders' National Association, Merchants' and Manufacturers' Exchange of Detroit, Mich.; Brooklyn Manufacturers' Association, National Association of Wool Manufacturers, Arkwright Club of Boston, Boston Chamber of Commerce, Illinois Manufacturers' Association, Southern Cotton Spinners' Association, Washington Board of Trade, New England Jewelers' and Silversmiths' Association, Merchants' Association of New York, Merchants' and Manufacturers' Association of Baltimore, St. Louis Millers' Club, National Founders' Association, National Business League, Pennsylvania Millers' State Association, Morocco Manufacturing Association, American Paper and Pulp Association, Kansas State Millers' Association, Free Hide League, Columbus (Ohio) Board of Trade, Manufacturers' Club of Wilmington, Del.; Dayton (Ohio) Board of Trade, Manufacturers' Club of Indianapolis.

D. A. Tompkins of Charlotte, N. C., a member of the Industrial Commission, was selected as temporary chairman, and E. L. Wilson of Cincinnati as temporary secretary.

H. B. F. MacFarland, president of the Board of District Commissioners, made a brief address of welcome. He said in part:

"Your presence here shows that you have come in the spirit of President McKinley's last public utterance at Buffalo, when he said, 'Reciprocity is the natural outgrowth of our wonderful industrial development under the domestic policy now firmly established. What we produce beyond our domestic consumption must have a vent abroad. The excess must be relieved through a foreign outlet, and we should sell everywhere we can and buy wherever the buying will enlarge our sales and productions and thereby make a greater demand for home labor.' The country awaits with interest your conclusions as to the practical application of these ideas with confidence that they will reflect the wisdom and efficiency which have made you leaders in its industrial development."

T. C. Search of Philadelphia, president of the National Association of Manufacturers, was selected as permanent chairman, and in taking the chair thus outlined the work of the convention. Following is a part of his address:

"Our aim has been to forestall tariff agitation, not to encourage it. It is the duty of this convention to harmonize, as far as possible, the widely differing opinions represented in this body, and to reduce to clear and forceful expression such principles as we hold in common. We are here to harmonize our views, not to emphasize our differences.

"I take it, we are all agreed as to certain general propositions such as these:

"That some of the duties embraced in our present tariff are no longer needful for the existence of the industries for whose protection they were imposed.

"That many of our industries have reached a stage in their development where the home market alone cannot absorb their entire product, and consequently new outlets are necessary for their continuous operation and the steady employment of their operatives.

"That the establishment of more cordial commercial relations with other nations by means of an exchange of tariff concessions would enlarge the foreign outlets of those industries for which increased export trade is necessary.

"That if such applications of the principles of commercial reciprocity could be made without injury to any of our industries the consequent expansion of our foreign trade would be beneficial to all our commercial and industrial interests.

"I judge that we are pretty well agreed as to the truth of these propositions. The problem with which we have to deal is the practical application of them.

"We are a progressive people, and I believe that our ideas of commercial reciprocity are broadening somewhat as our range of vision widens. The reciprocity that is wanted to-day is a reciprocity that means something, and promises something in the shape of tangible advantages for our commerce; not merely expressions of kind sentiment toward all the business world, but an actual giving and taking of concessions that will open wider for us the markets of the world and broaden the distribution of our products."

Upon the conclusion of Mr. Search's address vice-presidents of the convention were chosen, as follows: William F. Draper of Massachusetts, T. L. Hickman of Georgia, Chas. H. Harding of Philadelphia, James Deering of Chicago, Titus Sheard of New York and Robert J. Morgan of Ohio. Edward H. Sanborn of Philadelphia and E. P. Wilson of Cincinnati were chosen secretaries.

On reassembling after the recess the presiding officer announced that the discussion would be opened by two extended arguments designed to place before the convention two different phases of the reciprocity question. The two phases of the subject referred to would be presented by A. B. Farquhar of the A. B. Farquhar Company of York, Pa., manufacturers of agricultural implements, and Charles Heber Clark of the C. Elwood Lee Company of Conshohocken, Pa., manufacturers of surgical instruments. Mr. Farquhar was then introduced and made an able argument in favor of reciprocity. Mr. Clark followed in a strong plea against any form of tariff reduction, in the course of which he sharply criticised the advocates of reciprocity who would permit foreign goods to be brought into competition with American products under any circumstances.

The next speaker was George H. Barbour of the Michigan Stove Company, Detroit, who took issue with Mr. Clark upon the arguments advanced by him. The next speaker was Frank Lake, representing the Manufacturers' Club of Philadelphia, deprecating any attempt to revive tariff agitation. Delegate William S. Bass of the South Brooklyn Board of Trade read a short paper, entitled "The Inconveniences of Our Latin Neighbors," which was designed to show that the South American Republics were not in position to sacrifice the customs revenues which they would be obliged to surrender if they entered into reciprocity treaties with the United States. Henry Dalley, representing the New York Board of Trade and Transportation and the Manufacturing Perfumers' Association, sharply criticised the French reciprocity treaty.

S. O. Bigney of Attleboro, Mass., a manufacturing jeweler appointed to represent his industry, followed with remarks also directed chiefly against the pending French treaty. The last speaker regularly scheduled for the day session was George J. Seabury of the New York Board of Trade and Transportation, who opposed all forms of "tariff tinkering," but advocated that the present surplus in the Treasury be reduced by the repeal of the war taxes. At this juncture Geo. A. Laughlin of Wheeling, W. Va., apparently forgetful of the rule confining the discussion strictly to the subject of reciprocity, took the floor and made an attack on the United States Steel Corporation, in the course of which he said: "Before the formation of the corporation we were enabled to purchase steel billets at a price that permitted us to sell our product in all the great markets of the world. Since the formation of that corporation the price of steel billets has been fixed at such a high figure that the question to-day is not how we are going to extend that trade, but how we are going to retain the trade that has already been established."

At the conclusion of the session the presiding officer announced the following committees:

On resolutions: D. A. Tompkins, Charlotte, N. C.; Gen. Wm. F. Draper, president Home Market Club, Boston, Mass.; Titus Sheard, Little Falls, N. Y., representing National Association Knit Goods Manufacturers; W. R. Farrand, president Farrand Organ Company, Detroit, Mich.; P. W. Gates, Allis-Chalmers Company, Chicago, Ill., representing National Founders' Association; Chas. A. Schieren, New York Chamber of Commerce; S. T. McKnight, president Mississippi Valley Lumbermen's Association; Frank E. Kaufman, St. Louis Millers' Club; Murray Shipley, representing Manufacturers' Club, Cincinnati, Ohio; J. Gordon Gray, representing Manufacturers' Club of Philadelphia, Pa.

On finance: Hamilton Carhart, Detroit, Mich.; W. L. Saunders, New York; Owen Osborne, Pennsylvania; J. R. Lesson, Boston; Col. Julius J. Estey, Brattleboro, Vt.; James Deering, Chicago; C. R. Hoag, Newark, N. J.; H. C. Yeiser, Cincinnati, Ohio; Chas. A. Carlisle, South Bend, Ind.; Geo. A. Laughlin, Wheeling, W. Va.

A brief evening session was devoted chiefly to a discussion of the desirability of the repeal of the present duty of 15 per cent. on hides, which was participated in by delegates Harding of Philadelphia, Schieren of New York and others. F. B. Thurber of New York made a short speech in favor of reciprocity with Cuba, and gave notice that he would at the proper time present a resolution covering his views specifically.

(November 20, by Telegraph.)

The Committee on Resolutions began its sessions today, the special object of its deliberations being to formulate a resolution embodying the views of the convention as to the action which should be taken by Congress to render the reciprocity policy practicable. While it is yet too early to predict the outcome with any certainty, yet it seems likely that a resolution will be presented by the committee recommending that Congress authorize a commission charged with the duty of investigating the con-

dition of the various industries and reporting the findings to the Executive for guidance in negotiating reciprocal trade agreements. W. L. C.

The Zinc Smelting Corporation.

St. Louis, Mo., November 18, 1901.—Details of the plan to consolidate the large zinc smelting companies in this section have just leaked out. We are informed through authoritative sources of these plans. Options have been secured on all of the plants mentioned, and E. Rollins Morse & Bro. of 6 Wall street, New York, are endeavoring to conclude the details of the consolidation.

The company are to be known as the Zinc Smelting Corporation, with offices at 1 Exchange place, Jersey City, N. J. This company were organized under the laws of the State of New Jersey with a capital of $50,000,000, divided into $25,000,000 of 7 per cent. cumulative preferred stock and $25,000,000 of common stock. Five million dollars each of the preferred and common stock are to be reserved for the acquisition of properties in addition to those already contracted for and for other corporate purposes. The company have contracted for the acquisition of the Illinois Zinc Company, George E. Nicholson, Vulcan Spelter Company, Empire Zinc Company (Joplin, Mo., plant), Matthiessen & Hegeler Zinc Company (half interest), James La Tourette, S. H. Lanyon & Brother, Lanyon Zinc Company, A. B. Cockerill, Prime Western Spelter Company, Collinsville Zinc Company, St. Paul Mining Company, Kansas City Mining & Spelter Company, Cherokee-Lanyon Spelter Company, Girard Zinc Company and Bruce Mining & Smelting Company.

With the acquisition of these properties the corporation will, it is claimed, become possessed of a large amount of working capital, and in addition will receive an additional working capital of $600,000 in cash. It is contemplated that through efficient management and numerous economies the profits of the corporation will be largely increased beyond the combined profits of the individual plants, and with the present capacity and present market and consumption it is expected that the profits of the Zinc Smelting Corporation, from the production of spelter, zinc and sulphuric acid, will be close to $4,000,000 annually. The present production of spelter in America the prospectus states is about 140,000 tons per year, most of which has been consumed at home, over 60 per cent. being consumed by the steel and wire industries. Heretofore, it says, the exports have gradually increased, but during the present year the home consumption has been practically equal to the production. The European production is given as about 380,000 tons annually, and the consumption as fully 400,000 tons. The cost of production in Europe is placed at over $10 per ton more than in America, and the consumption per capita is more than 25 per cent. greater.

New Haven Iron & Steel Company.—Private advices from Columbia, Pa., state that negotiations are under way for the absorption of the New Haven Iron & Steel Company of New Haven, Conn., by the Susquehanna Iron & Steel Company. The latter company were organized in June, 1899, with a capital stock of $1,500,000, and own the following properties: Aurora Furnace Company, Wrightsville, Pa.; Columbia Iron Company, Columbia Rolling Mill Company and the Jansen Iron Company, Columbia, Pa.; Susquehanna Iron Company, Susquehanna, Pa., and Steacy & Denny Company, York, Pa. The New Haven Iron & Steel Company on the 15th inst. started up their two new mills, increasing their capacity two-thirds to 40,000 tons of finished iron and steel per annum. The improvements were all paid for out of the surplus, leaving a cash surplus on hand of over $100,000. They have three months' work on their books at profitable prices, and the outlook is very promising.

McClintic-Marshall Construction Company.—The McClintic-Marshall Construction Company, builders of iron and steel structures, with offices in the Park Building, Pittsburgh, and works at Rankin Station, are so crowded with orders that they have decided to materially enlarge their works at Rankin Station, which were completed only a few months ago. The addition will be built to the main structure of the plant, and will be 100 x 200 feet in size. It will be fitted up with electrical cranes and other modern equipment.

New Carnegie Records.

During the month of October the Homestead, Edgar Thomson and Duquesne Steel Works and the Upper and Lower Union Mill of the Carnegie Steel Company established new production records, the steel output reaching 343,971 tons for the month, which is at the rate of 4,127,652 tons of ingots per year. The output of rolled and forged product was 403,061 tons for the month, equal to an annual output of 4,836,732 tons. Compared with the total Bessemer and open hearth ingot production of the United States for 1900, the October rate of output of the Carnegie works would exceed 40 per cent. It is probable that this enormous make of steel will be continually increased. The mills making new records, compared with the best previous records, are as follows:

Products.	Old records. Gross tons.	New records. Gross tons.
Edgar Thomson Steel Works.		
Ingots	75,059	82,255
Rail mills	63,573	67,236
Duquesne Steel Works.		
Bessemer ingots	53,189	55,521
Open hearth ingots	38,314	40,431
16 and 21 inch mills	48,077	51,930
Homestead Steel Works.		
Bessemer ingots	39,600	40,954
Open hearth ingots, No. 2	39,851	40,613
Open hearth ingots, No. 3	64,588	65,269
38-inch mill	25,937	26,254
10-inch mill	2,786	3,138
33-inch cogging mill	17,801	18,017
33-inch finishing mill	8,299	9,015
40-inch mill	17,590	20,045
35-inch mill	15,610	17,537
32-inch mill	24,106	25,199
30-inch slabbing mill	26,696	27,970
128-inch plate mill	12,626	12,629
42-inch universal plate mill	8,228	9,161
Upper Union Mills.		
12-inch mill	2,408	2,864
17-inch mill	4,673	4,773
20-inch mill	4,462	5,784
Plate mill No. 1	5,334	5,966
Plate mill No. 2	3,761	3,926
Lower Union Mills.		
12-inch mill	2,178	2,429

Iron and Industrial Stocks.

Throughout the entire week the market in these lines has been very irregular. Early in the week there was an unsettling tendency, due to announcement of heavy engagements of gold for shipment to Europe. There was a recovery from this, however. Trading was comparatively light. As a rule the quotations were at about the same figure on Wednesday last as they were on the Wednesday preceding. The most active of the industrial stocks was American Locomotive preferred. It made a net gain for the week of 4¾ points, going from 85 on Thursday to 89¾ on Wednesday. American Car & Foundry made a gain of a point and a half in both the common and preferred issues. Tennessee gained a point also.

On the Pittsburgh Stock Exchange last week 110 was bid for preferred shares of the new United Engineering & Foundry Company. The capital stock authorized is $2,500,000 of 7 per cent. cumulative preferred and $3,000,000 common.

During the month of October a number of Pittsburgh industrial concerns materially increased their capital stock. The increase of the Carnegie Tube Company was from $150,000 to $300,000; Brown & Zortman Machinery Company, from $25,000 to $100,000; Keystone Car Wheel Company, from $200,000 to $400,000; National Cable & Wire Company, $11,000 to $500,000. All the above concerns are in Pittsburgh. The Saxman Coal & Coke Company, Latrobe, from $25,000 to $100,000. Brownsville Mfg. Company, Brownsville, Pa., from a nominal capital of $1000 to $125,000.

Dividends.—The directors of the Park Steel Company of Pittsburgh, one of the constituent companies of the Crucible Steel Company of America, have declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable December 2.

HARDWARE.

CLOSE BUYING.

There are many buyers in the Hardware and in other fields who are constantly hammering the market and in every way in their power endeavoring to obtain concessions in price from manufacturers and jobbers. This is sometimes done by resorting to practices which are of more than questionable propriety and inconsistent with a high sense of business honor. Those who are charged with the responsibility of buying either the raw material or the finished goods, avoiding this extreme, may at the same time look faithfully after the interests of their important department and maintain their position as close and successful buyers.

There is danger, on the other hand, that this department will be neglected. Many houses, both manufacturers and merchants, apparently do not understand not only the obligation but the necessity of purchasing goods at as low prices as are obtainable, for close buying is a necessary forerunner of profitable selling. This is generally recognized by large concerns, whether merchants or manufacturers—indeed a business is not likely to assume large proportions where this principle is disregarded. The buyer's department in large and enterprising establishments is acknowledged to be one which deserves the best attention and justifies the employment of competent talent. There are, however, many smaller merchants, and even manufacturers, who do not give proper attention to the buying of their goods. They do not appear to consider the money saved by close buying worth the time and trouble necessary to secure low prices, or they are so negligent and easy going in their methods that they do not care to make the requisite effort. Some even labor under the delusion that by paying high prices they win the good will of the manufacturers and jobbers with whom they deal. It is not necessary to point out that this is an entirely mistaken view of the matter, and while they may gain a little in this way, it is at the expense of losing much.

Manufacturers and jobbers do not accord the highest ratings to the houses paying the highest prices. They appreciate dealing with a concern run on strictly business principles, even though its purchases may be limited in quantity. Such a house is generally more favorably considered when favors are desired than the easy going concern paying higher prices. A good business man judges of the house he is dealing with largely by the business qualities shown by it. Close buying is regarded as a sign of good management which runs all through the business. The lack of close buying is a symptom of poor management which will show itself in other directions. The seller must always watch his credits carefully and be on the alert to detect weakness in those with whom he deals. He is generally willing to extend favors when he can do so with safety, for he desires to hold trade; but, first and last, he is concerned about getting the money due him. This is simply business. Nothing tends more to insure confidence in the good management and stability of a concern than to have goods bought carefully and payments made promptly. Those who are close buyers and avail themselves of the cash discounts are held in higher esteem commercially than houses who are careless in their buying and slow in their payments.

There are many small merchants who are content as a matter of course to pay such prices as are quoted them by the few houses from whom they purchase the great bulk of their goods and without making sufficient effort to ascertain whether or not the prices are as low as could properly be obtained by a little care and attention. While the amount thus lost on each invoice is relatively small, the aggregate during the year makes it a serious diminution from the profits of the business. The trade should recognize the truth of the principle that a saving in this department is as important in a small business as in a large one. This consideration has an added force in view of the fact that buying may be taken as an illustration of the business as a whole. Good buying, good store management, good collections and good profits naturally go together. Where there is careless buying there is generally found careless management in every department.

Condition of Trade.

Reports received from the various classes of trade indicate a satisfactory condition of things and a very general activity. With the merchants it is a season when business is naturally of large volume and makes exacting demands upon those in charge. The approach of Thanksgiving, which is a precursor of the holidays, is accompanied by increased attention to preparations for Christmas and New Year trade, of which many merchants are making more of late than heretofore. In this they are encouraged by the existing prosperity, which puts the people generally into an exceptionally good position to purchase articles of the better grade or of luxury. On this account the indications are that business of this character with the increased attention given to it by Hardware merchants will be unusually large. There is thus naturally a good deal of buying for the holiday trade in connection with the activity in winter goods generally. Among the increasing number of houses who buy well in advance of the season such lines as Poultry Netting, Lawn Mowers, Steel Goods, Wire Cloth, &c., are receiving especial attention, and the volume of business thus doing is heavy. There still continues to be a good deal of difficulty in getting certain classes of goods as fast as wanted, but the supply is catching up with the demand, and there is a prospect in some lines in which the manufacturers have been badly behind their orders that the trade will soon have little reason for complaint. There are, however, many who believe that in a good many lines there will next season be more or less scarcity if trade attains the volume anticipated. The general conditions throughout the country are most satisfactory. In connection with the existing prosperity the exceedingly advantageous position of the farming interests of the country, which has so direct a relation to the activity and profit enjoyed by the commercial classes, is a most important feature of the situation. It is interesting to note that notwithstanding the partial failure of the corn crop the value of the farm products of the country, as estimated by a high authority for the present year, is fully $400,000,000 more than last year. This certainly promises well for the business of the coming year, especially when taken in connection with the increase in the value of the grain products during the past five years, which exceeds that of the preceding five years by $1,000,000,000. The outlook for the sale of our products abroad is, on the whole, full of promise, and the year draws to a close with exceedingly satisfactory conditions.

Chicago

(By Telegraph.)

The one feature about the Hardware trade concerning which there is no question is that business is good. Some say it is remarkably good, but standards have

been raised, and what is now called good would have been superlative a year or two ago. Everything in stock is moving. One of the orders a day or two ago included some Screen Doors, the use for which at present is difficult to imagine. The Southwest is rising from the commonplace level through a larger buying of warm weather goods than is usual late in November, which fact is probably explained by open weather and active construction work. Goods like Planished and Wood Smooth Sheets are not allowed to tarry in stock, but melt away as rapidly as received, and various other lines are kept low in quantity and variety from the same necessity. Tin Plates are slowly getting back into circulation. A carload was sold this week from store for delivery in Mexico, following one or two similar shipments. The buyer had Tin Plates on the way from Wales, but ocean delays compelled quicker action. Heavy Hardware is in excellent demand, manufacturers calling for material in large quantities. More noticeable than for a long time is the buying of various kinds of material for future shipments. The spring trade has already begun, for in some lines present purchases will not be delivered until next March.

St. Louis.

(By Telegraph.)

The general conditions of the Hardware market have undergone no change of note since our report of last week. The demand is good and strong and a generally cheerful and satisfactory feeling is abroad. Prices in several lines are still in a rather unsettled condition, and in this connection we might mention Wire Nails and Steel Goods. There is also evident a rather uncertain feeling as to the jobbers' prices to be settled upon in the market for Poultry Netting. A steady and heavy demand is reported for Stove Pipe, Meat Choppers and Cutters and other goods, which came in special demand with the colder season. Preparations are to be noted for spring trade by the issuance of circulars and price-lists to salesmen on Wire Cloth, Window Screens, Screen Doors and Lawn Mowers, and some active selling of these lines is reported. As a result of the drought of last season the salesmen working in the territory that was most affected report a great falling off in the demand for Skates, on account of the complete disappearance in some sections of the familiar skating ponds.

San Francisco.

Miller, Sloss & Scott.—The conditions on the Pacific Coast have very much improved during the last two months. The teamsters' strike, which started in the latter part of July, and which finally spread so as to include all the laborers on the water front, has finally been settled and nearly all the old hands are back at their old places, having accomplished nothing except being idle for a little over two months.

The machinists' strike is showing signs of weakness, and it is reported that this soon will be a thing of the past, and machine shops will soon again be running with their customary force.

The demand for all kinds of Hardware is good, particularly in the building line. The grain crop of California has been exceptionally good this year, and has been nearly all taken care of. If business continues as good up to the end of the year as it is at the present time, we may look toward as good a year as we had last year.

There are rumors of a consolidation of all the Hardware interests on the Coast, but up to the present writing nothing definite has been accomplished.

Philadelphia.

Supplee Hardware Company.—Very little, if any, change has taken place in trade circles since our last letter to *The Iron Age*, and the volume of trade has been about on a level with the preceding two weeks. There was no apparent disposition on the part of the retail trade to curtail orders under their requirements, and there is at present no visible disposition to curtail or starve their stocks, with no apparent feeling of uneasiness or unrest in regard to prices.

Many manufacturers are catching up with their orders, but others are still deplorably behind, so as to cause great dissatisfaction with the retail trade, from the fact that it is not possible for jobbers to get certain goods. This is notably the case with Axes. If all jobbing houses have suffered equally with those we have in mind from complaints of their customers, owing to the inability of manufacturers to fill orders taken many months ago we certainly sincerely sympathize with them. Whether the capacity to produce of the present manufacturers is equal to the demand is best known to themselves; certain it is, however, that manufacturers have accepted orders beyond their ability to complete in time for consumers' wants.

Louisville.

W. B. Belknap & Co.—Business continues fairly good in all departments. There is a notable absence of the speculative feeling which prevailed last year and up to within a few months, when the facilities for production seemed wholly inadequate to the demand. It has been a source of wonder to all observers that the immense production has been taken up as rapidly and completely as it has. But it is hardly to be supposed that it will be maintained indefinitely, particularly when such great countries as France, Germany and England are "on the toboggan," although the recent bank statements from these countries even would seem to give us some hope that the bottom of their descent had been reached and that henceforward things would improve with them.

The railroads are still embarrassed for lack of rolling stock, particularly for the transportation of coal, and as every factory in the land is burning up a full complement of fuel the difficulty of providing coal and coke is very considerable.

This product, too, has been interfered with somewhat by the miners' strike in our State. Each State apparently has to undergo this strain in turn, and the officials of each in turn seem wholly incapable of dealing with it, until the matter becomes so acute that it is intolerable. The disregard for law which has resulted in lynchings and unpunished murders throughout our country finds its first impulse in the unwillingness of the proper officials to do their sworn duty to keep the peace, to make arrests for carrying concealed weapons, &c. This duty will hardly be performed until public sentiment demands it. When the election is once over and the gentlemen comfortably settled in their places, they use a great deal of discretion as to the construction of the law designed to protect personal rights and property. The State courts are woefully inefficient. When it comes to the United States courts, then it is a different matter, and it is almost the sole protection one can be sure of.

Omaha.

Lee-Glass-Andreesen Hardware Company.—The first half of November has witnessed little change affecting the distribution of Hardware and kindred goods in a jobbing way. It may be said, however, that such changes as have occurred have been, if anything, on the side of improvement.

The month opened auspiciously, and the advent of colder weather has imparted a stimulus to business, which will probably show a perceptible increase before the month closes.

Conditions in the agricultural districts are quite satisfactory, and collections are holding up well, merchants, as a rule, meeting their obligations promptly.

General business is still holding up to a high standard of activity. Indications all point to the continuance of a good, healthy trade in all lines for some time to come.

Nashville.

Gray & Dudley Hardware Company.—The cold weather for the past few days has increased the volume of business on seasonable goods, and the movement of Coal Hods, Stove Boards, Heaters, Meat Choppers, &c., has been very heavy. There is also a good business being done on Christmas goods and there is quite a scarcity of Boys' Iron Wagons. Most of the jobbers are out of the leading sizes and factories also are unable to supply the demand.

We look for trade to continue very brisk until about December 15, when, of course, the usual slacking up for the holidays will set in, and it will then be somewhat quiet until the first of the new year.

Collections are much better than when we made our last report.

Baltimore.

CARLIN & FULTON.—There is quite a good demand at present for goods strictly seasonable, and at this time of the year there is always considerable activity, especially with our near trade prior to the holiday season and to the time for taking the annual inventory of stock.

Many goods are not easily obtainable, or at least there is a great irregularity in the ability of the factories to supply all sizes of certain lines. This is not easily explained to the retailer and creates considerable dissatisfaction, but there seems no remedy for it.

With the price of Steel Billets at present $29 per ton, as compared with $20 per ton one year ago, which is an advance of 45 per cent., the manufacturers are showing great conservatism in holding prices where they are instead of taking advantage of the situation to put goods to a much higher level. It seems somewhat paradoxical to write of the immense demand and immense contracts for Steel and Iron taxing the capacities of the mills for months to come, and then hear of any line of goods being reduced in price, but this has happened with Steel Goods, such as Forks, Hoes and Scythes, and it would seem that the same lack of judgment which forced these goods to abnormally high figures is now acting to the other extreme.

There is a great probability that when the time comes for deliveries of the goods purchased at present prices in the lines just mentioned there may be a corresponding delay on the part of the factories in the execution of these orders, as the indications are that the contracts will be unusually large, looking forward to another reaction in price.

St. Paul.

FARWELL, OZMUN, KIRK & CO.—Business continues good. The weather has been very favorable for saving of crops. Threshing from the shock and flax threshing are finished. November trade and collections promise to be very satisfactory.

NOTES ON PRICES.

Wire Nails.—There is a constant demand for Wire Nails, but orders are usually for small lots, owing to the uncertainty felt by buyers regarding the future of the market. Prices are not uniform over the entire country, owing to competition, but regular prices are adhered to as closely as possible by the largest producers. Concessions are, however, obtainable in many cases by large buyers, and the market is represented in a general way by the quotations of $2.15 to $2.30, in carload lots, f.o.b. mill. In the prices made by jobbers to smaller merchants differentials between jobbers' and retailers' prices are not usually maintained, and the manufacturers who have recently entered the market are not observing any uniform rule regarding prices to the larger or smaller trade.

New York.—In the local market the demand for Wire Nails continues satisfactory, while orders are usually for small lots. There is more or less irregularity in prices and the market is represented in a general way by the following prices: Small lots at store, $2.35 to $2.40; carload lots on dock, $2.25 to $2.30. Orders for carloads are of rare occurrence.

Chicago, by Telegraph.—The Wire Nail market continues unsettled, prices being about the same as a week ago. There is scarcely any carload business from store, hence quotations in quantity are only nominal; but in small lots business keeps up to previous volume, and possibly slightly exceeds it. Quotations in small lots range usually from $2.40 to $2.45. Local trade is less active than the demand from the Southwest. There are as yet no stocks accumulating at mills, which is a sufficient commentary on the degree of activity. Mills will exert themselves to stock up during the next two or three months for the demand, which, from all indications, will then be large.

St. Louis, by Telegraph.—A fair demand about sums up the condition of the Wire Nail department of the market in this section and a lower range of prices is to be noted. A range in prices from $2.40 to $2.45 about reflects actual conditions.

Pittsburgh.—Conditions in the Wire Nail trade remain about the same as noted in these reports of several weeks past. There is a fairly large amount of business, but the supply of Nails is large and the tone of the market is weak. Reports are that a move is under way to make a price agreement between the leading Wire Nail mills, but so far nothing definite has been done. We quote Wire Nails at $2.15 to $2.20 in carload lots, and $2.20 to $2.30 in less than carload lots, all f.o.b. Pittsburgh. For a very desirable order it is probable our lower quotation of $2.15 could be shaded.

Cut Nails.—The market for Cut Nails continues firm and there is a fair demand considering the season. Owing to the scarcity of Steel it is difficult to obtain prompt shipment on some sizes of Nails. Quotations are as follows, f.o.b. Pittsburgh, plus the actual freight to point of destination, terms 60 days, or 2 per cent. off in 10 days:

Carload lots	$2.05
Less than carload lots	2.10

New York.—The Cut Nail demand in the local market is normal. New York quotations for carload and less than carload lots are as follows:

Carload lots on dock	$2.18
Less than carload lots on dock	2.23
From store	$2.20 to 2.25

Chicago, by Telegraph.—Cut Nails are practically neglected. Quotations are too close to Wire Nails for attention from buyers.

St. Louis, by Telegraph.—A good demand and inquiry for Cut Nails is reported and quotable prices show no change. Small lots from store are quoted from $2.30 to $2.35.

Pittsburgh.—The supply of Steel is better, and Cut Nail mills are making fairly prompt shipments, but the shortage of cars is interfering with deliveries to some extent. There is a moderate demand and the tone of the market is quite firm. We quote for domestic trade, f.o.b. Pittsburgh, plus Tube freight to point of destination, terms 60 days, or 2 per cent. off in 10 days:

Carload lots	$2.05
Less than carload lots	2.10

Barb Wire.—The requirements for Barb Wire are naturally growing smaller over the larger part of the country as the season advances, although the Southwest is still ordering a considerable quantity of Wire. The output of the mills has not been materially reduced, and this, together with competition, results in prices being slightly shaded in some cases. The market, however, is generally steady. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots, Painted	$2.60
To jobbers in carload lots, Galvanized	2.90
To jobbers in less than carload lots, Painted	2.65
To jobbers in less than carload lots, Galvanized	2.95
To retailers in carload lots, Painted	2.70
To retailers in carload lots, Galvanized	3.00
To retailers in less than carload lots, Painted	2.80
To retailers in less than carload lots, Galvanized	3.10

Chicago, by Telegraph.—The one bright spot in Barb Wire is in the Southwest, which continues to ask for product as if it were the active season. Prices are unchanged. Carload lots are quoted at $2.75 for Painted and $3.05 for Galvanized. Less than carloads are quoted $2.85 and $3.15, respectively, with these prices firmly held.

St. Louis, by Telegraph.—A quieter feeling is evident in the market for Barb Wire and the range of prices is slightly lower. Jobbers quote carload lots of Painted at $2.75 and Galvanized at $3.05, less than carload lots at $2.80 for Painted and $3.10 for Galvanized.

Pittsburgh.—As the season advances demand for Barb Wire steadily falls off, and with a heavy supply prices are naturally weak and concessions are easily obtainable on good orders. For domestic trade, and for such orders as are being placed at this season of the year, we quote as follows: Galvanized Barb Wire, $2.90 in carload lots to jobbers, and Painted, $2.60. Terms 60 days net, 2 per cent. discount for cash in 10 days, f.o.b. Pittsburgh. It should be noted, however, that the above prices are shaded for good orders.

Plain Wire.—Orders for Plain Wire for delivery after the first of the year constitute the bulk of the business at present. Prices continue irregular on desirable orders. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. off for cash in 10 days:

Base sizes.	Plain.	Galv.
To jobbers in carload lots	$2.25	$2.65
To jobbers in less than carload lots	2.30	2.70
To retailers in carload lots	2.35	2.75
To retailers in less than carload lots	2.45	2.85

The above prices are for the base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9	Base	$0.40	extra.
10	$0.05 advance over base	.40	"
11	.10 " " "	.40	"
12 and 12½	.15 " " "	.40	"
13	.25 " " "	.40	"
14	.35 " " "	.40	"
15	.45 " " "	.75	"
16	.55 " " "	.75	"
17	.70 " " "	1.00	"
18	.85 " " "	1.00	"

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

Chicago, by Telegraph.—The demand for Plain Wire may be illustrated by the fact that a large producer of Poultry Netting has sold almost his entire product for nearly a year, buyers getting into line early in order to secure desired deliveries next spring. Carload lots of Wire are held at $2.40 and small lots from stock at $2.50.

St. Louis, by Telegraph.—A quiet demand is reported by jobbers for Plain Wire, and No. 9 is quoted $2.40 to $2.45, and Galvanized at $2.80 to $2.85, and the usual advance for other sizes.

Pittsburgh.—There is a fair amount of business, but mostly from the consumers of Wire, who are getting ready for the spring trade. The jobbers have not yet commenced to place contracts. Concessions in prices of Plain Wire are being made for desirable orders and at competitive points:

To jobbers in carload lots	$2.25
To jobbers in less than carload lots	2.30
To retailers in carload lots	2.35
To retailers in less than carload lots	2.45

Galvanized Wire up to No. 14 is 40 cents advance on Plain; Nos. 15 and 16, 75 cents advance, and Nos. 17 and 18, $1 advance. Terms are 60 days net, with 2 per cent. off for cash in 10 days, f.o.b. Pittsburgh.

Lawn Mowers.—The indications are for a satisfactory season in Lawn Mowers, with a good volume of business at reasonably remunerative prices. The trade apparently did not carry over a great many goods from last season, and the jobbers and larger retailers are showing a disposition to buy in somewhat more than the usual quantities. There continues to be a large demand for the cheapest grade of Mowers, which are, as a rule, sold at very close prices, leaving the manufacturers only a narrow margin of profit. These goods are necessarily of an inferior quality and serve their purpose for only a comparatively short time. While dealers continue to handle them in large quantities, there is said to be something of a tendency toward better goods, as the trade are becoming more critical and recognize the better value of the higher grades. The prices of this class of Mowers are slightly higher than last season, owing to the higher price of Iron and advances which have taken place in labor. There were, however, early in the season, a good many orders taken at about the same prices as last year, but there have been subsequent advances of 10 or 15 cents. Competition between the manufacturers is keen, which keeps prices down to a close figure.

Building Paper.—There is some stiffening in prices on this class of goods, a complaint being that it is difficult to get deliveries from the manufacturers on account of the brisk demand, while the congested state of the railroads, owing to a shortage of cars, further complicates matters. In car lots Rosin Sized Sheathing is being offered at $25 to $28 per ton, some quoting as high as $30 and $35 in smaller lots. In Tarred Roofing, single ply, a fair price at manufacturing points is $25 per ton; two-ply, per roll, 40 cents; three-ply, per roll, 60 cents; no freight allowance. Slaters' Tarred Felt is quoted at $27 per ton in car lots, with an advance of 5 per cent. on smaller purchases.

Cordage.—No material change has taken place in the condition of the Rope market during the week. Although manufacturers' quotations are the same, Sisal Rope is a little firmer in price. Different manufacturers' quotations vary as follows: Manila Rope, on a basis of 7-16-inch and larger, 12¾ to 13 cents, and Sisal, on the same basis, from 8¾ to 9¼ cents per pound. A ¼-cent rebate for larger lots is allowed. Demand is comparatively light. Quotations on Jute Rope are as follows: Jute Thread Rope, ¼ inch and up, 6½ cents for No. 1, and at 6 cents for No. 2. Jute Yarn Rope, ¼ inch and up, 5 cents per pound.

Glass.—Considerable interest is manifested as to the probable outcome of the meeting to be held this week by the combined Glass manufacturers and the jobbers' association. The price agreement between the American Window Glass Company and the Independent Glass Company, it is understood, will soon expire, and it is not known whether it will be renewed. If it is not, and manufacturers outside the combines pursue an independent policy, some interesting developments in regard to prices are expected. The Co-operative Federation, whose output was contracted for by the Pittsburgh Plate Glass Company, for the purpose of maintaining prices, is another factor in the situation. If the combined manufacturers, singly or in harmony, make a cut in the price of Glass to meet or undersell the importers and the independent domestic factories, the Co-operative Federation is likely to be heard from. Under the circumstances the position of the jobbers' association is considered strong, as they will probably be in a position to accept or reject the prices and terms of the combine regarding the placing of their large order for early delivery next year. For several weeks past there has been no regularity or firmness in the Glass market, as far as the first three brackets of single strength are concerned. Jobbers are making prices to meet quotations, which in some cases are below 85 and 20 per cent. discount. Invoices are, in some cases, made out with net figures, instead of in the regular way with list prices and discounts.

Paints and Colors.—*Leads.*—There is a perceptible falling off in the demand for White Lead in Oil, incident to the restricting of outside work with the advance of the season. The market continues fairly steady for small lots of White Lead in Oil. Quotations remain unchanged as follows: In lots of 500 pounds or over, 6½ cents; in lots of less than 500 pounds, 7 cents per pound.

Oils.—*Linseed Oil.*—The supply of spot Linseed Oil is yet inadequate to fully supply the moderate demand. There is a difference of opinion among the trade regarding the future of the market. The opinion is expressed by some that after the first of the year prices will be much lower. On the other hand, it is reported that 60 per cent. of the new Flax Seed crop has been purchased by crushers at the high prices which have been ruling, and that in consequence it is thought that crushers cannot afford to let the market fall off to any great extent. However, the market for spot Oil is easier, and futures for Western Oil are offered at lower figures. City Raw, for immediate delivery, is quoted at 60 to 61 cents, according to quantity, and Western Raw at 56 to 57 cents per gallon, according to quantity. For January to June deliveries of Western Raw 53 to 54 cents is being asked. Independent New York State

crushers are quoting spot Raw Oil, delivered, at 57 cents, and Boiled Oil at 58 cents per gallon, in less than carload lots.

Spirits Turpentine.—Demand for Turpentine has been comparatively light during the week, buying being confined to jobbing lots. The market is firm at the following quotations, according to quantity: Southerns, 37½ to 38 cents; machine made barrels, 38 to 38½ cents per gallon.

NEW ENGLAND HARDWARE DEALERS' ASSOCIATION.

THE regular monthly meeting of the New England Hardware Dealers' Association was held at the United States Hotel, Boston, November 13, preceded, as usual, by a meeting of the Executive Committee, at which considerable business was transacted. Dinner was served at 5.30 p.m., to which about 50 persons sat down. President George A. Burditt presided and at the close of the dinner introduced Congressman Samuel L. Powers of the Eleventh Massachusetts District, who delivered an interesting address on the subject, "The Typical American."

Mr. Powers said that the typical American was the average American, one possessing the characteristic traits upon which the national character was founded. These traits were industry, thrift, love of education, courage, good nature and patriotism. We were a nation of workers and the loafer had no place under the Stars and Stripes. There were 27,000,000 of people in the United States engaged in the gainful occupations. Of this number more than 17,000,000 were wage earners and constituted a tremendous moral and political force in upholding American institutions. Thrift was the ability and capacity for accumulating wealth. The valuation of the property possessed by the American people amounted to 90,000,000,000 of dollars, of which sum 25,000,000,000 were accumulated during the decade from 1890 to 1900. This sum was greater than the entire property accumulated from the landing of Columbus down to the breaking out of the Civil War, and the present valuation of property possessed by the American people was greater than that which had been accumulated by all races through all ages from Adam down to the time of the adoption of our Federal Constitution in 1789.

Referring to our railroad system, Mr. Powers said that the American people had constructed and equipped during the last 60 years 180,000 miles of railroad—enough in extent to encircle the globe seven times and leave a surplus sufficient to build a line from Boston to San Francisco. He referred to the adoption of methods of economy which had proved so essential to industrial development and cited as an illustration the fact that the charge in 1837 for transporting a ton of freight one mile was 7 cents, while in 1890 the charge was only three-fourths of 1 cent.

Referring to our love of education, he said that the American people fully recognized that the safety and security of free institutions depended upon the intelligence of the masses, and that we expended last year $200,000,000 for free, compulsory education of our people, this sum being more than was expended by Great Britain, Germany, France, Belgium, Italy and Spain combined.

He said that courage was a characteristic trait of Americans and was so recognized by the world since the day when Captain Parker with his undisciplined band of men and boys met the regulars on Lexington Green down to the night that Dewey sailed into Manila Harbor over the submarine mines and beneath guns of frowning forts.

Referring to the good nature of the typical American, he told many stories to illustrate this characteristic and closed with a tribute to American patriotism.

Following this L. H. Pease of the Stanley Works, New Britain, Conn., was called upon and addressed the company briefly. On motion of Charles E. Adams a rising vote of thanks was tendered Congressman Powers. During the evening vocal music was furnished by James W. Calderwood.

Secretary Farless announced that the Entertainment Committee for the December meeting were D. Fletcher Barber, Henry M. Sanders and James A. Farless. This meeting will be held December 11, and will be the annual ladies' night of the association. It is expected that Lieut.-Governor John L. Bates will be the principal speaker of the evening.

FOREIGN SHIPMENTS OF WIRE AND NAILS.

A VERY satisfactory exhibit of the condition of our export interests is given in statistics from the Custom House relating to the shipments of Wire and Nails from Eastern ports during October. The figures show that their volume during that month aggregated 7500 tons, which was nearly 40 per cent. in excess of the shipments in September, and makes October the record month for the year.

Australia was the largest buyer of Wire last month, 12 lots, amounting to no less than 2616 tons, and including a single shipment of 1022 tons, having been forwarded to various antipodean ports. The Wire exports to South American countries were also especially heavy last month, the total shipments being 1260 tons, distributed as follows: Buenos Ayres, 720 tons, in seven lots; Rosario, 214 tons, in three shipments; Brazil, 208 tons, in three lots; Chile, 125 tons, in one consignment, while the balance was forwarded to Montevideo. The South African shipments aggregated 914 tons in three lots. Mexico took four shipments, representing in all 250 tons.

The exports to Europe amounted to 952 tons, of which the United Kingdom took 893 tons, made up thus: Manchester, 655 tons, in four lots; London, 88 tons, in three shipments; Liverpool, 56 tons, in three shipments; Bristol, 50 tons, in one lot, while the balance was distributed almost equally between Hull and Glasgow. The Continental European export buyers were France and Sweden. Minor Wire shipments were also made during October to Cuba, Bombay, China and Japan.

The export shipment of Nails during last month amounted to 1226 tons. Australia was the largest purchaser, 342 tons in seven shipments going to various ports in that part of the world. The exports to Far Eastern ports amounted to 211 tons. Consignments to China and Japan aggregated 205 tons, while the balance went to Bombay. The total shipments to Europe were 269 tons. Following are details of the consignments: To the United Kingdom, 116 tons, in two lots; Liverpool, 58 tons, in one lot; Glasgow, 57 tons, in two consignments, while the balance was about equally divided between Newcastle-on-Tyne and Leith. The shipments to Continental Europe comprised 73 tons, the ports to which consignments were made being Havre, Copenhagen, Trieste and Marseilles. South America took 124 tons of Wire Nails in October, Brazil being forwarded 115 tons, the balance going to Chile. Minor shipments also went to Mexico, Manila and South Africa.

DEATH OF BENJAMIN FRANKLIN ERRINGTON.

BENJAMIN FRANKLIN ERRINGTON died at his home at Clifton, Staten Island, November 19 of pneumonia. Mr. Errington was born at Yarmouth, England, in 1822, and came to America when quite a young man. For a few years after his arrival in America he was connected with Harper & Bros., publishers, and then, in 1848, associated himself with his brother-in-law, Alfred Field, who, with others, founded the house of Alfred Field & Co. in 1836 and had been continuously connected with this firm ever since. A. H. Saxton, who has been intimately associated with Mr. Errington for 47 years, bears testimony to the fact that he was the most upright and pure minded man he has ever known, and under all circumstances a gentleman. During all this long time he had never heard Mr. Errington utter a word that could not be uttered in the most refined assembly. He was lovingly considerate of all about him, and always ready to ignore and efface himself if by so doing he could bring help and sunshine to others.

NORVELL-SHAPLEIGH HARDWARE COMPANY.

IN connection with the maturing of plans as to the carrying on of their business, the Norvell-Shapleigh Hardware Company, St. Louis, have been considering the question as to whether or not it was advisable to have a retail department, and have recently issued the circular given below, in which they announce to the retail Hardware trade of the city that they have decided not to open a retail store when they move into their new building. It is also determined, in accordance with the policy pursued during the five months since the reorganization of the company, that they will confine their business strictly to Hardware, Cutlery and Sporting Goods, and on exclusively wholesale lines. We understand also that as far as possible, considering the varied conditions which exist in the wide territory which they cover, they will seek only the trade of legitimate dealers in Hardware. This policy will certainly meet with the approval of the trade.

We are advised that it is one of the principles of the new organization not to have any agreements or understandings with any of their competitors in regard to the regulation of prices or other matters, and the company are not a member of any association or other trade organization. They do not believe that the time has yet arrived when individuality in business is to be eliminated, and, as far as it is possible, hope to develop the closest personal relations with their customers.

The company are making arrangements by which they secure the sale in their territory of certain leading lines of goods, among which are those of the Clinton Wire Cloth Company, Geneva Tool Company, Belding-Hall Mfg. Company and J. J. Vollrath Mfg. Company, as referred to in the circular given below:

The large increase and satisfactory condition of our wholesale business, both in the city and in the country, and the strong sentiment that prevails among retail Hardware dealers and also the manufacturers that it is not in harmony with the spirit of the times for jobbers to come in competition with their own customers through a retail department, led our Board of Directors to unanimously vote against opening a retail department in our new building when it is completed.

As the Hardware trade in St. Louis will no doubt be interested in our decision, I take this occasion to promptly advise you that this question is now settled. For some time past we have had placed prominently at the front door of the office of our wholesale business signs reading, "No Goods Sold at Retail."

On the first of the year we propose to largely increase our facilities for taking care of our city business. Our city department will be placed under the direction of one of our most valued and experienced men. We are very sincere and earnest in our desire to serve the city trade of St. Louis in a prompt and satisfactory manner. We are constantly adding to our lines of goods and increasing our stock, and we are sure those dealers who have not in the past received service that was altogether satisfactory will find a constant improvement on our part.

The reorganization of this business took place too late in the year for us to accomplish very much in rearranging our fall lines. You will, however, find us very strong in spring lines. We have secured the exclusive sale for this city of Clinton Wire Cloth, Geneva Steel Goods and Belding New Perfection Refrigerators. We will carry a heavy stock of Lightning Freezers, Wabash Screen Doors and Window Screens. We have also secured the control for the Central West of a new line of Colored Enamel Ware manufactured by Vollrath of Sheboygan, Wis.

Our salesman will call to see you in the near future with our bottom prices, best terms and full information in regard to these and many other lines of goods, and we trust you will give us liberal encouragement in the way of orders, not only for immediate wants, but for these various lines of spring goods for future delivery.

BUCKLEY-HART MFG. COMPANY.

THE CRESCENT BRASS & IRON COMPANY and the Hart Company of Detroit, Mich., have been consolidated under the name of the Buckley-Hart Mfg. Company. They will continue to make the same lines as have heretofore been made by the separate companies—namely, Plumbers' Supplies, Lawn Sprinklers and Nozzles, Hardware Specialties, Brass and Bronze Vaults, Trimmings, Elevator Inclosures, Grilles, Toy Banks, &c. The officers of the new company are as follows: Jas. P. Buckley, president; Robert W. Hart, vice-president; Wm. C. Anderson, secretary; Richard P. Joy, treasurer.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

J. N. Schwartz & Co., Hardware merchants, Salina, Kan., are about to engage also in the wholesale business, and will value catalogues and quotations pertaining to Shelf and Builders' Hardware, Iron and Steel and Wagon Wood Work.

Station Equipment Company, Marquette Building, Chicago, advise us of their desire to receive catalogues from manufacturers of engines of all kinds, boilers and pumps.

W. W. Whitehead Company, with main office and shops at Davenport, Iowa, have just transferred their sales organization to 204 Dearborn street, Chicago. The company are desirous of having a complete collection of catalogues in their line on file in this office, and request that manufacturers of Engines, Boilers and Pumps favor them with their printed matter.

WESTLAKE MFG. COMPANY.

SEWING MACHINES are one of the lines of which many Hardware merchants have taken hold during the past few years, to their satisfaction and profit. It is a line which comes in as naturally, if not more so, than Bicycles and other articles which are generally marketed through this channel. Reports show that the sale of Sewing Machines through the medium of the Hardware trade is constantly increasing, and promises soon to attain large proportions, in view of the energetic efforts which some of the manufacturers are making to induce merchants to handle them. Among the well-known manufacturers in this line are the Westlake Mfg. Company, Chicago, Ill., who have just issued Catalogue B, relating to the ball bearing New Howe, Kensington and Westlake Sewing Machines, which are fully illustrated and described. Particular attention is called to the latest addition to their line of Sewing Machines—the five-drawer automatic lift and drop head cabinet, style No. 12—which combines the well-known sewing qualities of the New Howe with tasty, artistic cabinet work, making it an especially handsome piece of furniture. The machine will sew anything from silk to the heaviest bulky goods. Attention is also called to the variety of work possible with the attachments furnished with this machine.

TRADE ITEMS.

THE LUFKIN RULE COMPANY, Saginaw, Mich., and 280 Broadway, New York, have issued a catalogue of some high grade specialties of their manufacture adapted for advertising purposes. Among the articles are Pocket Tapes of both steel and linen in nickeled cases 3, 5 and 8 feet long; Universal Tapes, leather cases, 25, 33 and 50 feet lengths; Flexible Steel Pocket Rules, 1 and 2 feet long in cases; machine divided Flexible Steel Rules, graduated to sixty-fourths, 4 and 6 inches long, and Hickory Board Rules, 3 feet long. These goods are sold in lots of hundreds or thousands to manufacturing and other concerns who wish to give them away, their business address and card being put on the goods in a suitable place.

INCORPORATION papers have been taken out for a paint company, known as the Orr, Dean & Barry Company, successors to the Orr & Abbott Paint Company, Columbus, Ohio. The officers of the new company are as follows: President, Oliver Orr, Columbus; vice-presi-

dent, Geo. M. Gray, Coshocton, Ohio; secretary, Geo. Barry, Columbus; treasurer, H. Clay Dean, Columbus; superintendent, B. B. Naylor, Columbus. Mr. Orr was one of the original owners of the Orr & Abbott Paint Company, who were established in Columbus in 1879. Messrs. Dean and Barry have been traveling salesmen for the Orr, Brown, Price Drug Company of Columbus, the former for the past 13 years, and the latter for the past 11 years. Mr. Naylor is a practical paint maker, and has had a wide experience. Geo. M. Gray is engaged in the retail and wholesale Hardware business in Coshocton. The company will continue to manufacture the high grade liquid paint that has been on the market for a number of years. Everything is now being made ready for the active prosecution of business, and salesmen will start out on the road within the next few weeks.

THE PENN SHOVEL COMPANY, Corry, Pa., have opened an office at 21 Beekman street, New York, and appointed Charles S. Stephens general sales agent. All inquiries should be addressed to him. The company now have their new works in operation, producing large quantities of goods. Mr. Stephens is also general sales agent for the Penn Radiator Company, whose works are also at Corry, Pa.

AMONG THE HARDWARE TRADE.

Spencer Hardware Company, Keene, N. H., have recently completed and moved into one of the best equipped stores in that section of the country. The establishment is 125 feet long by 32 feet wide, with 12-foot ceiling. Its location is such that an ample sufficiency of light is obtained. The front is practically all of glass, having a broad recessed landing and a double entrance. The show windows on either side are 8 feet deep. Eighty feet from the front the store is divided by a half partition and grill, the rear part being used mainly for bulky stock and for shipping and receiving goods. The store fixtures are of oak and ash, mainly. There are large wall cases with glass fronts near the entrance, those on the right being devoted to Cutlery and Sporting Goods, and those on the left to Tools and Builders' Hardware. There are also tall glass floor cases of the "silent salesman" type, filled with similar goods. Extending to the rear the shelving on either side is filled with Hardware of all descriptions, and there are center counters, beginning a good distance from the entrances, where miscellaneous goods in large variety are displayed. The rear of the store is devoted largely to Paints, Oils, Agricultural Tools and other heavy or bulky goods. The basement, used for storage, is reached by a broad stairway in the rear of the partition near the office. The store is provided with gas and electric lighting fixtures. The business was established about 1815, the firm having changed several times. I. N. Spencer, the senior member of the present company, has been connected with the store since 1855, and has been a partner since 1864, being one of Keene's oldest merchants.

J. Mangan & Sons, retailers of Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements, Sporting Goods, &c., Beresford, S. D., have incorporated under the style of the Mangan Hardware Company, and on January 1 next will assume and continue the business. They purpose enlarging their facilities so that they may be in a better position to look after the requirements of their patrons.

Rumage, Malone & Cooper is the style of a new concern who have lately opened up in the Hardware, Stove, Tinware, Agricultural Implement and Sporting Goods lines at Hobart, Oklahoma. They will carry on a wholesale as well as retail business.

Culler Bros. have lately opened up in business at Perrysville, Ohio, handling a stock comprising General Hardware, Stoves and Furnaces, Farm Implements, Paints, Varnishes, &c.

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SHOW WINDOW DISPLAY.

The trade are invited to contribute information in regard to methods which have proved satisfactory, with descriptions of attractive displays. Inquiries also are solicited, to which careful attention will be given.

HARDWARE STORE WINDOW DISPLAY.

BY B. W. HAVERFIELD.

PART II.

SILVERWARE, LAMPS AND CARVING SETS.

The colors used in this display, which is shown in Fig. 5, were pale blue, white and royal purple. The windows were illuminated with 25 electric lamps placed at top of window. The front and rear arches had 32 multicolored electric lamps. The front arch, which sets 3½ feet in front of the rear arch, had ten electric lamps on the back of the arch. These could not be seen from the street and added very materially in lighting the interior of the window. Each section of lights was controlled by separate switch.

Fig. 5.—Silverware, Lamps and Carving Sets.

The parlor lamps shown on the front arch or frame work, each had an incandescent light on the inside, which were lighted during display. The rear arches were supported by columns of white. All arches and frame works were covered with white puffing made of crushed white paper. The borders and trimming were of royal purple puffing made of cheese cloth.

All shelving and display cards were covered with royal purple velvet. About half of the goods in the display were solid Sterling Silver Ware in white satin lined cases. The rest was Plated Hollow and Flat Silver Ware, Sterling Silver Novelties, Cut Glass Ware, fancy Lamps and Carvers in cases. The color effect in this window, especially at night, was magnificent and attracted a great deal of attention, not only from customers of the store but of the local press. Nearly all goods in this display were priced in plain figures.

POCKET AND TABLE CUTLERY, BRONZE AND CHINA CLOCKS, NICKEL AND BRASS GOODS.

The design and frame work in this display, Fig. 5, was the same as used in the Silver Ware window just described and were both on display at the same time, giving the front of the store quite a handsome and elaborate appearance. The colors used, pale blue, white and royal purple, handsomely illuminated at night with multicolored electric lights. The fronts of the arches were decorated with holly, palms and ferns. All arches and frame work were covered with white puffing. The borders and edges were trimmed with royal purple puffing. The shelving and display cards were covered with royal purple. The goods shown in this window consisted of Pocket and Table Cutlery, Razors and Manicure Goods, Child's Sets, Nut Picks and Cracks, Clocks, 5 o'clock Teas, Chafing Dishes, Toy Ice Cream Freezers, &c. All goods were priced in plain figures.

STEEL GOODS DISPLAY.

The only frame work used in this display, Fig. 7, consisted of four Wagon Wheel Rims covered with White crushed paper and fastened to the back and ends of the window. Long Handled Steel Goods, such as Garden and Lawn Rakes, Cotton Field and Garden Hoes, Hay and Manure Forks, were set up on inside of these half circles, and the D Handle goods sat around outside of same. The floor was a good representation of a tile floor and was made first by covering the floor with white paper. On top of this was placed dark green card boards cut into squares, leaving every other space white. On the floor was a Five-Tooth Cultivator, Horse Garden Harrow, Hand Garden Plow, Garden Barrow, Grass Hooks, Pruning Goods, Scythes, Grub Hoes, Mattocks, Poultry Netting, Hand Corn Planters, &c. Prices were marked in all goods in plain figures.

FISHING TACKLE DISPLAY.

A glance at Fig. 8 clearly shows that all the frame work necessary for this particular display consists merely of a square frame set up in the center of the window and covered with red bunting, the edges and borders being of green puffing of tissue paper. Upon this frame were mounted Lines, Pole Tips, Tie Guides, Furnished Lines, &c., and around each end was placed a stack of Guns.

The Horseshoe in center of the display was made in the same way and from it were displayed Reels costing from 10 cents to $20. Diagonally across the center was the sign "Good Luck to Fishermen."

The back and end walls were first covered with red

bunting, over which was stretched Minnow Netting. The fan shaped festoons in rear were made of white crushed paper over Netting, and a border of green tissue paper. Upon the crushed paper was displayed Jointed Rods. Against back wall and on each side of the horse-

Fig. 6.—Cutlery, Clocks, Nickel and Brass Goods.

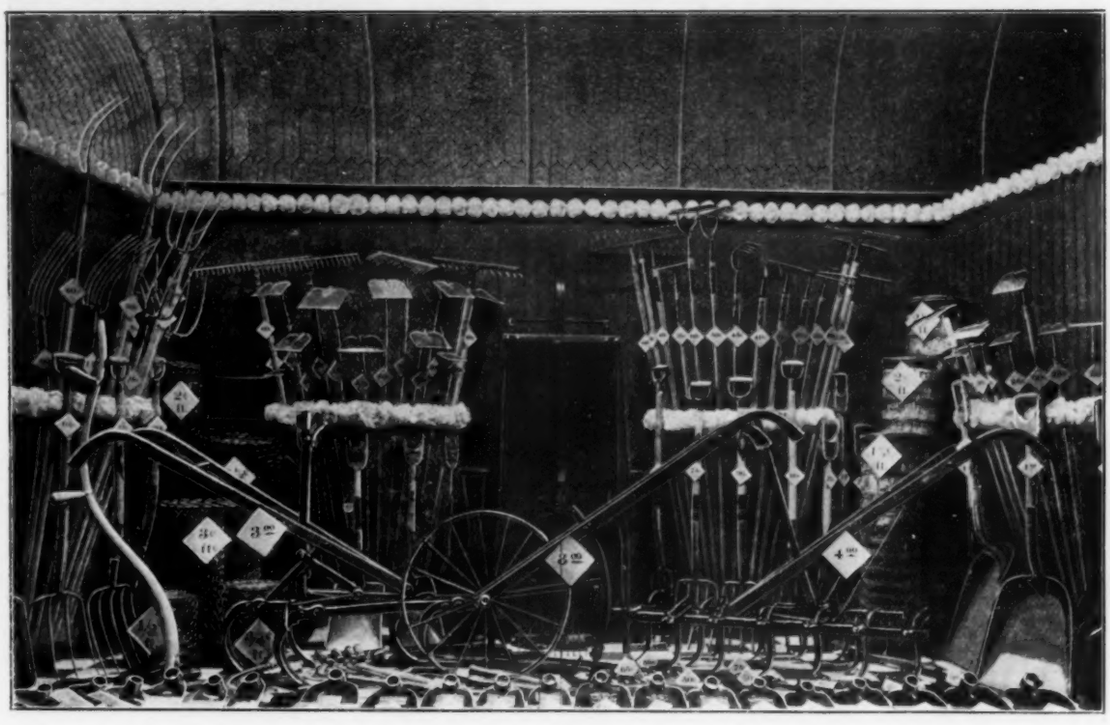


Fig. 7.—Steel Goods Display.

shoe was a stack of Rifles, around a half oval fastened to wall. On the floor space were placed the Sundries kindred to this line of goods. In center and a little in rear of the horseshoe was a 5-gallon Minnow Tank, upon which was a 1-gallon Jug, bearing a card, "Snake Medicine."

Three prizes were offered for the largest black bass caught during the season with our Tennessee Bass Line and Tennessee Bass Hooks. The first prize being a Tennessee Bass Reel valued at $15, the second prize a Split Bamboo Rod valued at $10, and the third prize a Bristol Steel Rod valued at $5. This window attracted a great deal of attention and sold a large amount of goods.

SPORTING GOODS DISPLAY.

What carpenter or frame-work was necessary to produce the display of Sporting Goods illustrated in Fig. 9 is very apparent from a glance at the cut. It consists merely of two triangle columns, three arches and step

shelving. The triangle columns were made of light lumber and covered with red bunting, and were edged with green tissue paper puffing, upon which were sampled Baseball Mits, Catchers' Gloves and Masks. One of these was placed in each of the back corners of the window. Over each was placed a small arch of the same construction, upon which were sampled Tennis Rackets and Boys' Bats.

The center of the window was occupied by a large arch, in the rear of which was a step shelving. The arch was made of light lumber, and covered with blue velvet, and edged with white puffing. On this were placed Reels and Lines of every description. The back and end walls, also floor space, was nicely arranged with goods relating to the Sporting Goods line. Price cards were freely used in this display.

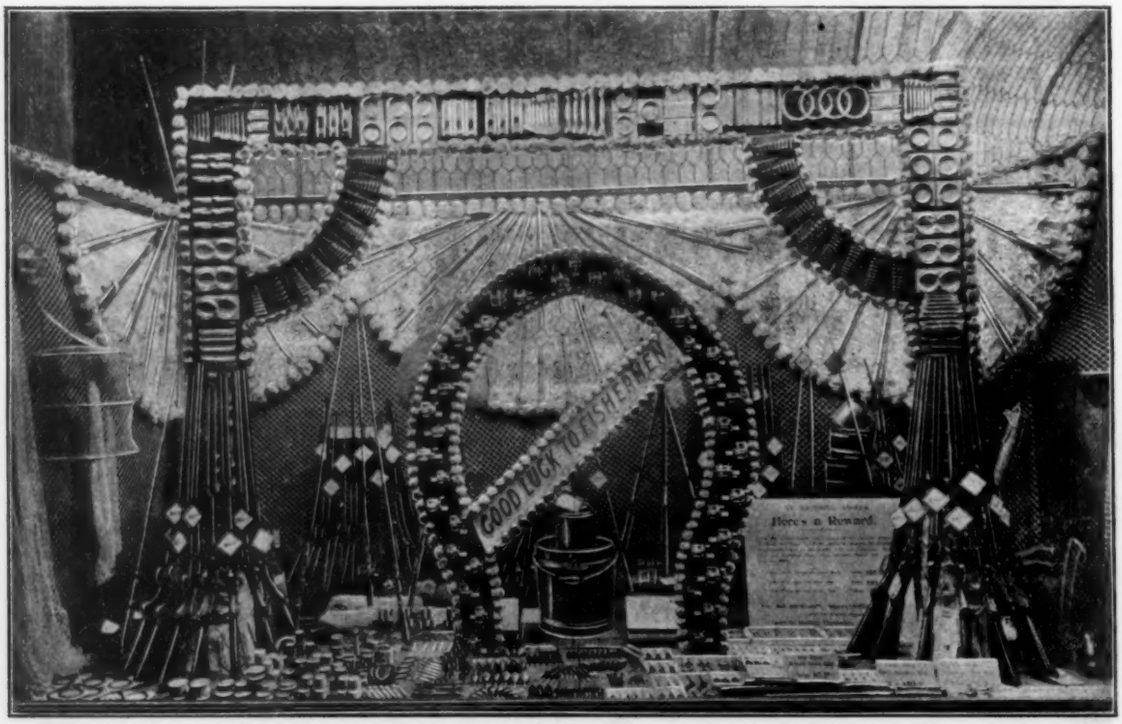


Fig. 8.—Fishing Tackle Display.

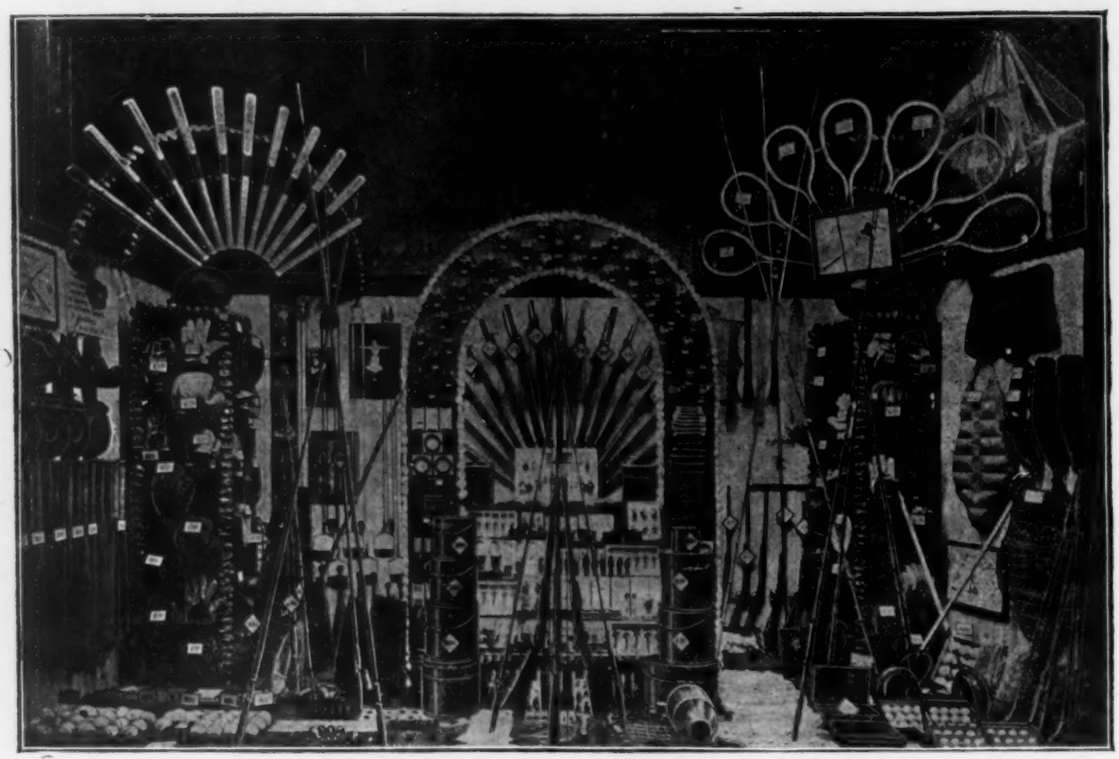


Fig. 9.—Sporting Goods Display.

HOUSE FURNISHING GOODS DISPLAY.

Fig. 10 shows a line of merchandise that is very hard to make an attractive display of, although if tastily arranged in window at the proper season of year, with plenty of price and descriptive cards, it will attract the prospective buyer and make sales. Particular attention

might be called to the gathered draperies at the back and top of the window, and the rather striking effect they produce.

PRICE-LISTS, CIRCULARS, &c.

CHICAGO SOLAR LIGHT COMPANY, Department 32, Chicago, Ill.: Catalogue of the Nulite Incandescent Vapor Gas Lamps, which are referred to as burning about 94 per cent. of air and 6 per cent. of hydrocarbon gas, making a pure, steady, strong and economical light. The catalogue illustrates the line of these Lamps which the company are making, including Wall, Table and Student Lamps, two, three and four light Chandeliers, Indoor and Outdoor Arc Illuminators, Street Lamps, &c.

C. E. JENNINGS & Co., 101 Reade street, New York: Special illustrated descriptive catalogue of 28 pages, 11½ x 7¾ inches, devoted to Tool Chests and Tool Cabinets for the hardware trade filled with tools, suitable for professional mechanics, gentlemen amateurs and boys, listed from $12 per dozen to $50 each. There are also lines of empty Tool Chests for carpenters and wood worker, machinists and jewelers, each made with reference to the particular trade they are for.

THE KEYSTONE MFG. COMPANY, Buffalo, N. Y.: Catalogue No. 12, relating to their line of Keystone Reversible Ratchets, Monarch Single Acting Ratchets, Socket Wrenches, Tap Wrenches, Stud Drivers, Westcott Adjustable S Wrenches for nut and pipe, Taper Sleeves, Steel Sockets, Nail Sets, Boring Tool Holders, &c.

ROLLMAN MFG. COMPANY, Mount Joy, Pa.: Postal folder, calling attention to their Rollman Apple Cutter and Rollman Cherry Seeder.

INTERNATIONAL SILVER COMPANY, successors to Meriden Britannia Company, Meriden, Conn.: For the use of merchants in facilitating the sale of their "1847 Rogers Bros." brand, the company issue a handsomely engraved hanger, about 17 x 12 inches in size, which calls particular attention to their latest design in this brand, the Avon pattern.

ECLIPSE MFG. COMPANY, Elmira, N. Y.: Twenty-four-page catalogue of the improved Morrow Coaster Brake for bicycles, the 28 illustrations showing the various processes employed in its manufacture, in which there are 264 different operations and handlings.

THE ADAMS COMPANY, Dubuque, Iowa: Catalogue No. 7, devoted especially to their Hardware Specialty line. It illustrates Diamond Extension Fire Backs and Front Grates, Diamond Adjustable Cook Stove Damper, Diamond Stove Pipe Damper, Diamond Vise, Adams Register, Barrel Truck, Gradometer, &c. They have recently added several new articles to their line.

MISCELLANEOUS NOTES.

Fine Manicure Sets, Razors and Scissors.

Graef & Schmidt, 107 Chambers street, New York, sole agents for the United States and Canada of Joseph Henckels, Solingen, Germany, have now, they believe, the largest line of manicure and scissors cases ever brought to this country. Some of the later importations are in mother of pearl, tortoise shell and ivory, the assortment aggregating about 150 patterns.

Fig. 10.—House Furnishing Goods Display.

Another new line is in the way of razor cases in the sizes to contain four and seven razors, with handles of ivory and (black) hard rubber. The cases, covered with genuine black seal leather, are rectangular in form with partial telescoping covers, that for seven razors being 6½ x 3¼ x 1¼ inches, the others being only 2 inches wide instead of 3¼ inches. The seven-day case has the name of each day of the week in gold in connection with each razor compartment, the same being true for the four-razor case, except that the days named are Sunday, Tuesday, Thursday and Saturday.

In scissors cases there are some elegant examples in genuine seal containing five pairs of scissors. The blades and handles are of steel with beautiful mountings of pearl, tortoise shell and ivory, the scales being each side of the steel and artistically riveted on, some of them costing the trade $20 a case.

For importation orders only, under their own brand, they have on exhibition some new styles of library

scissors for the fine trade. These are made of fine material with antique ornamental brass handles, each being sheathed nearly to the bows in both ornamental brass cases and a combination of brass and leather, some of which have silver plated surfaces. Six lengths of scissors are made in each style, the more recent styles here mentioned being in addition to 75 other styles of similar character longer on the market. This kind of scissors is also put up in sets of two and three, while still other sets contain library scissors and paper cutter in combination.

Furnace or Heater Pipe Tin in Rolls.

Wheeling Corrugating Company, Wheeling, W. Va., and 47 Cliff street, New York, have just put on the market heater pipe tin in rolls for the convenience of tinsmiths and others who manufacture furnace or heater pipe of tin. The metal is seamed together in lengths 120 feet long and 20 inches wide, each length containing 200 square feet, either IC or IX tin. The material is packed for shipment in sheet iron casks or cylinders with wooden heads, so that it is well protected until needed. An important feature of this product is that the workman is always prepared to make up any diameter of pipe from one bundle of each grade of stock, instead of being compelled to carry tin plates in boxes of the various sizes needed for each diameter, some of which are seldom used.

Hockey, Wood Top Racer and Rocker Skates.

Barney & Berry, Springfield, Mass., and 114 Chambers street, New York, have added to their comprehensive line of ice skates several that are new to the trade. No. H is a low priced hockey skate, with blades of solid steel, hardened and extra long bearing. The tops are of crucible steel, bright finish. This skate is screwed permanently to the shoe sole. No. H F is the same skate, except for the complete detachable fastening, it having double threaded screw clamps, adjustable sidewise on the shoe sole. Both are made in sizes 9, 9½, 10, 10½, 11, 11½ and 12 inches in grade 0, bright, and grade 2, nickeled. Style C is a wood top racer with button heel, the runner being tempered, polished and nickeled; lengths 14, 16 and 18 inches. The top is rosewood finished, center and toe plates are set flush and all metal parts are finely polished and nickel plated. Blades are ⅛-inch thick. Another new skate is No. R, wood top rocker. The wood is birch, well finished; blades cast steel, polished; sizes 9½ to 12 inches inclusive, with black leather, tongue buckle straps.

Novelty Coal Hod.

H. H. Franklin Mfg. Company, Syracuse, N. Y., have just put on the market the novelty coal hod, No. 3, herewith illustrated. It is a fine metal casting, silver plated, polished and lacquered and particularly suitable for holiday trade. Its extreme hight, including raised bail, is 2⅝ inches, the body of it being designed for holding

Novelty Coal Hod.

toothpicks, pins, matches, cigar ashes, or any small trinkets. They are put up in individual boxes and sold to the trade by dozen or gross, and can be retailed at 25 cents each at a good profit.

Gossett's Detachable Suspension Hinge.

Fig. 1 of the accompanying cuts represents a hinge for window screens and storm and cellar windows, offered by F. D. Kees, Beatrice, Neb. The hinge is made of sheet steel, secured in place by screws, and is so constructed that window screens or storm windows can be lifted off or hung to the window frame from inside the

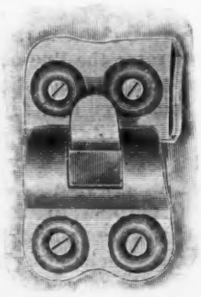


Fig. 1.—Gossett's Detachable Suspension Hinge.

house, thus dispensing with the use of ladders, nails, buttons, hooks, &c. The manner of attaching a storm window is shown in Fig. 2. It also illustrates the manner in which the storm window may be opened outward at the bottom, giving access to the outside from inside the room. It is shown that those who make use

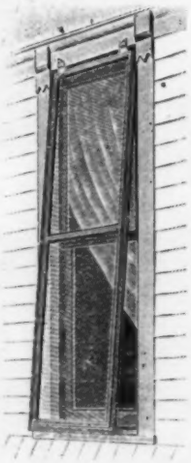


Fig. 2.—The Application of Gossett's Suspension Hinge.

of both window screens and storm windows on buildings can, by attaching the lower section of the hinge to both the screen frame and the storm window, make them interchangeable, making it a simple process to lift one off and hook the other on, when the change of season requires it. Lower sections of the hinge will be furnished separately for this purpose. In Fig. 3 is illus-

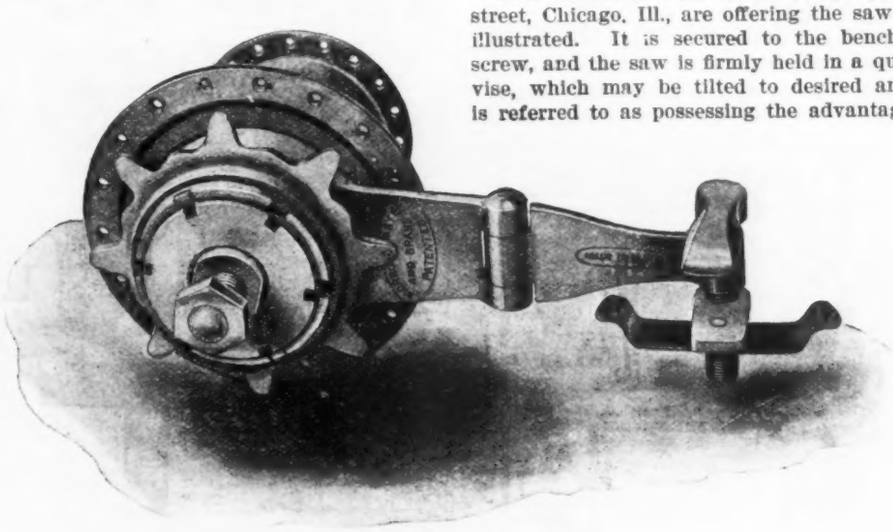
Fig. 3.—Special Fastener for Storm Windows.

trated a fastener for storm windows, which is designed to serve as a lock to the windows and to hold storm windows open for ventilation. The fastener is made of steel wire, japanned, and is 9 inches long. The hinges are packed complete with screws, one dozen in a box, 12 dozen in a case.

L. S. Tyler, who has been in business in Salem, S. D., for the past 18 years, has sold out to his brother, L. A. Tyler, and E. E. Hallas, who will continue under the style of Tyler & Hallas. Mr. Tyler has worked in the store and tin shop for the past 15 years. L. S. Tyler, the former proprietor, will hereafter devote his entire attention to the First National Bank of Salem, of which he is president.

Improved Morrow Coaster Brake.

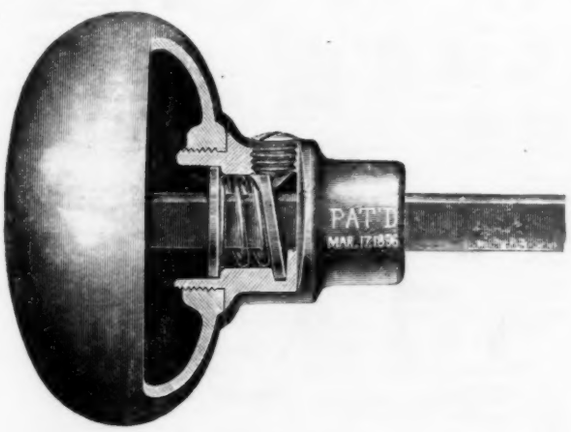
Eclipse Mfg. Company, Elmira, N. Y., have just brought out for the coming season's trade an improved form of the Morrow coaster brake, as here illustrated. While the working parts of the brake are substantially the same as last year, there have been betterments in the parts with which the workman has to do in applying the device to various makes and styles of bicycles. The change in this detail lies in the arm, which extends out and connects with the lower rear fork of the bicycle. As made previously this arm was solid, necessitating considerable labor on the part of the individual when putting in the Morrow hub, as the arm had to be bent to conform to the different models of cycles. This arm is now hinged so that it adjusts itself to any style, shape or form of bicycle. Another improvement is the substitution of a new clip for attaching the end of the arm to the frame of the cycle. This clip is adjustable so as to fit any size of tubing. Still another change is in making the hub dust proof.



Improved Morrow Coaster Brake.

The Noack Adjustable Screwless Knob Spindle.

The Noack Mfg. Company, Stamford, Conn., are offering the adjustable screwless knob spindle shown herewith. A square washer is fitted at the bottom into a recess in the knob shank, and is held in position by a spiral spring. When the proper adjustment is made a full turn of the knob screw forces the top of the washer obliquely against the spindle and, it is remarked, locks it securely. Perfect adjustment and a rigid fastening, it is shown, are thus secured. All of the company's knobs are provided with this improved fastening, and the company refer to the fact that they have the sole right to manufacture under this patent.



The Noack Adjustable Screwless Knob Spindle.

The American Saw Filer.

The American Saw Filer Company, 163 Randolph street, Chicago, Ill., are offering the saw filer herewith illustrated. It is secured to the bench by a thumb screw, and the saw is firmly held in a quickly adjusted vise, which may be tilted to desired angle. The filer is referred to as possessing the advantage of perfectly regulating the depth, bevel, hook, angle and size of the saw teeth. Being adjustable in every part, it is remarked that the filer works equally well on any saw, and that it is especially adapted to band, meat, carpenter, metal and buck saws. A person sharpening a saw with a filer, it is stated, will cut fast, smooth and to the line, for the filer is correct, making each tooth the same depth and angle. The inexperienced, it is claimed, can file the most difficult saw with absolute accuracy.

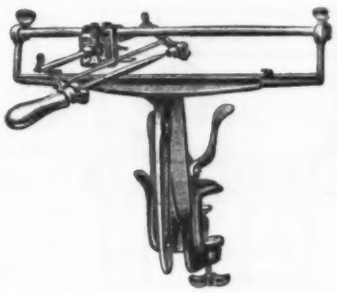


Fig. 1.—The American Saw Filer.

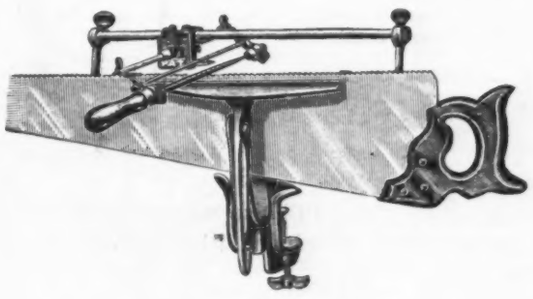


Fig. 2.—Filer with Saw in Position.

Gray & Bennett have opened up a new retail business at Flandreau, S. D. They will carry a full line of Builders' Hardware, Stoves, Tinware, House Furnishing Goods, &c. They will also conduct a department devoted to hot air, steam and hot water heating and ventilation.

PUBLISHERS' DEPARTMENT.

THE IRON AGE ADVERTISING CUTS.

We illustrate in the next column, reduced in size, a few of the advertising cuts which we have especially gotten up for the use of Hardware merchants.

The appearance and effect of the cuts (full size) is shown in the accompanying examples.

The cuts shown are selected as relating to lines of goods which in the experience of Hardware merchants are found suitable for holiday sale, and are adapted for newspaper advertising and use in circulars at this season.

No. 85.—Price 50 cents.

No. 86.—Price 50 cents.

It will be observed that some of the cuts shown are of such a size that a number of them may be used in an advertisement occupying moderate space.

No. 563.—Price 20 cents.

No. 564.—Price 20 cents.

No. 556.—Price 20 cents.

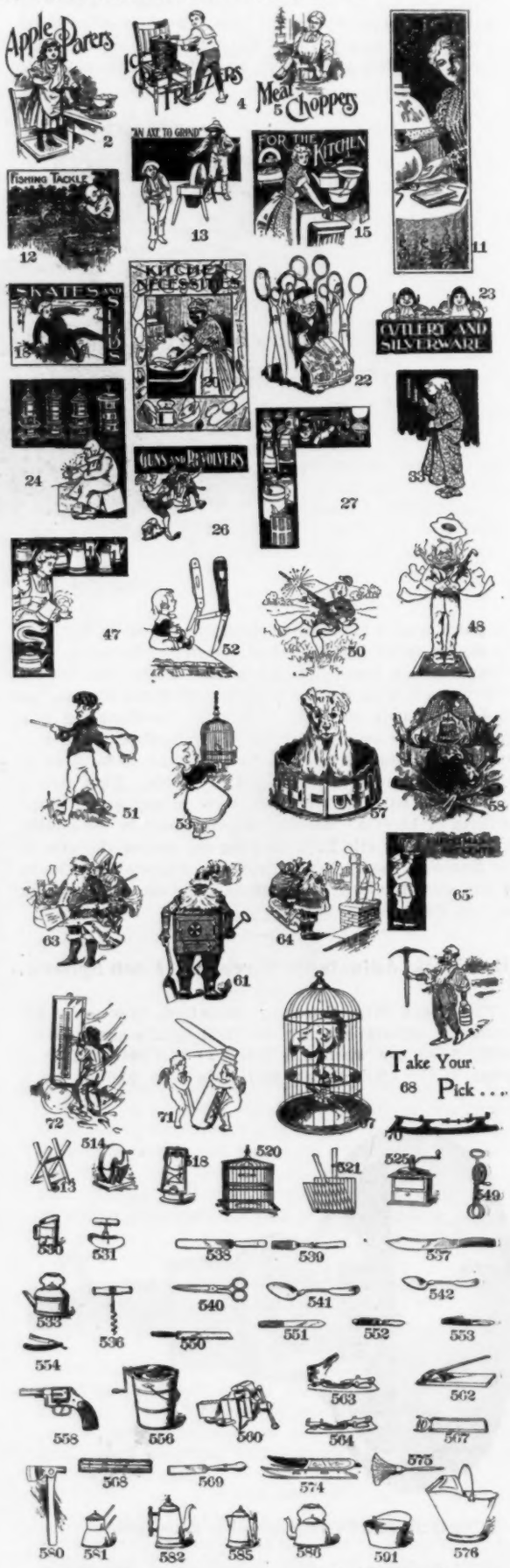
The prices of the full size cuts represented in the accompanying reduced illustrations are as follows:

Nos. 23 and 26 .....Each, 40 cents.

Nos. 2, 4, 5, 11, 12, 13, 15, 18, 20, 22, 24, 27, 33, 47, 48, 50, 51, 52, 53, 57, 58, 61, 63, 64, 65, 67, 68, 71, 72, 85, 86,..... Each, 50 cents.

Nos. 70, 513, 514, 518, 520, 521, 525, 530, 531, 533, 536, 537, 538, 539, 540, 541, 542, 549, 550, 551, 552, 553, 554, 556, 558, 560, 562, 563, 564, 567, 590..... 20 cents each; 6 for $1.

The Iron Age advertising cuts which are represented by the following reduced reproductions are three times the size shown here.



A circular giving prices and illustrating our line of advertising cuts will be mailed on application to

DAVID WILLIAMS COMPANY,
232-238 William Street, New York.

Current Hardware Prices.

REVISED NOVEMBER 19, 1901.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓@33⅓&10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent discount.

Cut Prices.—*In the present condition of the market there is a good deal of cutting of prices by the jobbing trade, whose quotations are often lower than those of the manufacturers.*

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE INDEX SUPPLEMENT (April 4, 1901), which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters Blind—

Domestic, ₩ doz. $2.00.....33⅓@33⅓&10%
North's.....10%
Zimmerman's—See *Fasteners, Blind.*

Window Stop—

Ives' Patent.....25&5%
Taplin's Perfection.....30%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anvils—American—

Arman 1 Hammer, Wrought ₩ lb 8½@8¾¢
Buel l'a ent Trenton.....₩ lb 9½@9¾¢
Eagle Anvils.....₩ lb 7¾@7¾¢
Hay-Budden, Wrought.....9¢@9¼¢
Horseshoe brand, Wrought.....9¢@9.4¢

Imported—

Peter Wright's.....9½¢@9¼¢

Anvil, Vise and Drill—

Millers Falls Co., $18.00.....20%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Hull Bros. Co.:
Lots of 1 doz.....25%
Smaller Lots.....20%
Lots of 3 doz.....30%

Augers and Bits—

Com. Double Spur.....70@70&10%
Boring Machine Augers.....60&10&10@70&10%
Car Bits, 12-in. twist.....60@60&10%
Jennings' Pattern
Auger Bits.....50&10&5@60%
Ford's Auger and Car Bits.....40&10%
Former Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip. E. Jennings list.....40%
No. 30. E. Jennings' List.....50%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits 15&10@15&10&5%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....50&10%
Snell's Car Bits, 12-in twist.....60%
Wright's Jennings Bits (E. Jennings' list).....50%

Bit Stock Drills—

Standard List.....65@65&5%

Expansive Bits—

Clark's small, $15; large, $26.....50&10%
Lavigne's Clark's Pattern, No. 1, ₩ doz., $26; No. 2, $18.....50&10%
C. E. Jennings & Co., Steer's Pat.....33⅓%
Swan's.....60%

Gimlet Bits—

Common Double Cut..gro. $2.25@2.75
German Pattern.....gro. $3.25@4.50

Hollow Augers—

Bonney Pattern, per doz. $11.00@11.50
Ames.....25&10%
New Patent.....25&10%
Universal.....20%
Wood's Universal.....25%

Ship Augers and Bits—

Ford's.....40%
Snell's.....40%
C. E. Jennings & Co.:
L'Hommedieu's.....15&10%
Watrous'.....40%

Awl Hafts, See *Hafts, Awl.*

Awls—

Brad Awls:
Handled.....gro. $2.75@3.10
Unhandled, Shouldered gro. 55@60c
Unhandled, Patent.....gro. 60@70c
Peg Awls:
Unhandled, Patent....gro. 31@34c
Unhandled, Shouldered..gro. 55@70c
Scratch Awls:
Handled, Common..gro. $2.50@4.00
Handled, Socket..gro. $11.50@13.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

First Quality, best brands..$5.50@5.75
First Quality, other brands $5.25@5.50
Jobbers' Special Brands:
Good Quality.....$4.50@4.75
Best Quality.....$5.00@5.25
Cheap, Handled Axes.....$5.50@5.75
Beveled, add 25c doz.

Axle Grease—See *Grease, Axle.*

Axles—

Iron or Steel.

Concord, Loose Collar....4½@5c
Concord, Solid Collar....4¾@5¼c
No. 1 Common.....3½@3¾c
No. 1 ½ Com. New Style..3¾@4c
No. 2 Solid Collar.....4¼@4½c
Nos. 11 to 14.....70@70&10%
Nos. 15 to 18.....75@75&10%
Nos. 19 to 22.....75@75&10%

2% cash 10 days.

Boxes, Axle—

Common and Concord, not turned..
lb. 4¼@4½c
Common and Concord, turned.....
lb. 4¾@5c
Half Patent.....lb. 8@9c

Balances—Sash—

Caldwell new list.....50%
Pullman's.....60%

Spring—

Spring Balances ... 50&10@50&10&5%
Chatillon's:
Light Spg. Balances.....40&10%
Straight Balances.....40%
Circular Balances.....50%
Large Dial.....80%
Pe cuze.....50%

Barb Wire—See *Wire, Barb.*

Bars—Crow—

Steel Crowbars, 10 to 50 lb., per lb..
2¾@3c

Beams, Scale—

Scale Beams, List Jan. 12, '83.40&10%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters—Egg—

Standard Co.:	₩ gro.
No. 5 Steel Handle Dover...	$6.50
No. 10 Cast Handle Dover...	$8.00
No. 10 Steel Handle Dover...	$8.00
No. 15 Ex. Hy. Steel Hdl...	$15.00
Rival...	$1.00
Taplin Mfg. Co.:	₩ g. o.
No. 60 Improved Dover...	$6.50
No. 75 Improved Dover...	$7.50
No. 75-2 Imp'd Dove , Tin'd...	$9.00
No. 100 Improved Dover...	$8.00
No. 102 Improved Dover, Tin'd...	$9.50
No. 150 Improved Dover, Hotel.	$15.00
No. 152 Improved Dover, Hotel, Td.	$ 7.00
Lyon's, Standard size...	₩ doz. $1.75
Wonder (S. S. & Co.)...	₩ gro. $7.50

Bellows—

Blacksmith's, Standard List. 70@70&10%
C. E. Jennings & Co., Blacksmith..60&10%
C. E. Jennings & Co., Hand.....33⅓%

Blacksmiths—

Inch..	*30*	*32*	*34*	*36*	*38*	*40*
Each..	*$3.50*	*3.75*	*4.25*	*4.80*	*5.35*	*6.15*

Extra Length:

Each..	*$4.00*	*4.55*	*5.10*	*5.60*	*6.40*	*7.50*

Molders—

Inch..	*9*	*10*	*11*	*12*	*14*	*16*
Doz...	*$6.75*	*7.25*	*8.50*	*9.50*	*12.00*	*14.50*

Hand—

Inch...	*6*	*7*	*8*	*9*	*10*	*12*
Doz....	*$3.75*	*4.25*	*4.50*	*5.00*	*5.7*	*6.75*

Net Prices.

Bells—Cow—

Ordinary goods.....75@5@75@10%
High grade.....70@70@10%
Jersey.....75&10%
Texas Star.....50%

Door—

Abbe's Gong.....45%
Barton Gong.....55%
nome, R. & E. Mfg. Co.'s.....55&10%
Lever and Pull, Sargent's....40@40&10%
Yankee Gong.....55%

Hand—

Hand Bells, Polished.....60&5@65&5%
White Metal.....55@55&10%
Nickel Plated.....50@55&10%
Swiss.....60@60&10&5%
Silver Chime.....32½@32½&10%

Miscellaneous—

Farm Bells.....lb. 2@24c
Steel Alloy Church and School.....
50&10&5@60%
National Bell Foundry Co.:
Superior Cast Steel Church and School Bells.....50&10&5@60%
Wilmot & Hobbs Mfg. Co., Gongs.....70%

Belting—Rubber—

Agricultural (Low Grade) 75&10@80%
Common Standard.....75@75&10%
Standard.....70@70&10%
Extra.....60&10&5%
High Grade..... 55&10@50&10&5%
Boston Belting Co.:
Seamless Stitched, Imperial.....45&5%
Boston.....50&5%
Niagara.....60&5%

Leather—

Extra Heavy, Short Lap...50&10@60%
Regular Short Lap ... .60@60&5%
Standard.....60&10@65&10%
Light Standard.....65@70%

Cotton—

Rossendale-Reddaway B. & H. Co.:
Sphinx Brand.....60&10%
Durable Brand.....70%

Bench Stops—See *Stops, Bench*

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters.....20%
Stoddard's Lightning Tire Upsetters.....40&50%

Bicycle Goods—

John S. Leng's Son's 1899 list:
Chain.....50%
Parts.....50%
Spokes.....50%
Tubes.....60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Bit Holders—See *Holders.*

Blind Adjusters—See *Adjusters, Blind.*

Blind Fasteners—See *Fasteners, Blind.*

Blind Staples—See *Staples, Blind.*

Blocks—Tackle—

Common Wooden.....70@10@75%
Cleveland's Steel.....60&10&70%
Ford's Star Brand Self Lubricating..
60&10%
Hollow Steel, Ford's Pat. Star Brand...
50&10%
Lane's Patent Automatic Lock and Junior.....30%
Stowell's Novelty, Mal. Iron.....50&10%
See also *Machines, Hoisting.*

Boards Stove—

Zinc, Crystal, &c.....40@10@..%

Bolts—

Carriage, Machine &c.—

Common, list Jan. 30, '95..65&2½@..%
Norway Iron, $3.00, list Oct. 7, '84...
80@80&5%
Phila. Eagle, $3.00 list May 24, '99....
80@80&10%
Bolt Ends, list Jan. 30, '95...70@70@..%
Machine, list Oct. 1, '99.....70@2½@..%
Machine with C. & T. Nuts.....
65@7½@..%

NOTE—*The rapid advances in manufacturers' prices enable the jobbers to cut prices freely.*

Door and Shutter—

Cast Iron Barrel, Round Brass Knob:

Inch.....	*3*	*4*	*5*	*6*	*8*
Per doz...	*$0.26*	*.30*	*.39*	*.47*	*.65*

Cast Iron Spring Foot:

Inch	*6*	*8*	*10*
Per doz.....	*$1.00*	*1.35*	*1.75*

Cast Iron Chain, Flat, Japanned:

Inch.....	*6*	*8*	*10*
Per doz.....	*$0.75*	*1.05*	*1.30*

Cast Iron Shutter, Brass Knobs:

Inch.....	*6*	*8*	*10*
Per doz.....	*$0.67*	*.80*	*1.00*

Wrought Barrel Brass Knob:

Inch.....	*3*	*4*	*5*	*6*	*8*
Per doz...	*$0.44*	*.50*	*.61*	*.70*	*1.28*

Wrought Barrel .....70@10@75&5%
Wrought " Bronzed.40&5@50&10%
Wrought Flush, B. K..50&10@60&10%
Wrought Shutter...40&10&10@60&5%
Wrought Square Neck.....50@50&10%
Wrought Sunk.....60@50&10%
Ives' Patent Door.....60%

Stove and Plow—

Plows.....60&5@..%
Stove.....77½%

Tire—

Common.....77½%
Norway Iron.....80@80&5%
American Screw Company:
Norway Phila., list Oct. 16, '84....82½%
Eagle Phila., list Oct. 16, '84.....85%
Bay State, list Dec. 28, '99.....77½%
Franklin Moore Co.:
Norway Phila, list Oct. 16, '84..82½%
Eagle Phila., list Oct. 16, '84.....85%
Eclipse, list Dec. 28, '99.....77½%
Port Chester Bolt & Nut Company
Empire, list Dec. 28, '99.....77½%
Keystone Phila. list Oct. '84.....85%
Norway Phila., list Oct. '84.....82½%
Upson Nut Co.:
Tire Bolts.....77½%

Borers, Tap—

Borers Tap, Ring, with Handle:

Inch.....	*1¼*	*1½*	*1¾*	*2*
Per doz..	*$4.30*	*5.00*	*5.75*	*7.25*

Inch	*2¼*	*2½*
Per Doz.....	*$8.65,*	*11.50*

Enterprise Mfg. Co. No. 1, $1.25; No. 2, $1.65; No. 3, $2.50 each.....25%

Boring Machines—*See Machines, Boring.*

Boxes, Mitre—

C. E. Jennings & Co.....40%
Seavey's, per doz., $30.....40%

Braces—

NOTE.—*Most Braces are sold at net prices.*

Common Ball, American..$1.15@1.25
Barber's.....50&10&10@60&10%
Fray's Genuine Spofford s.....60%
Fray's No. 70 to 120, 81 to 133, 207 to 414.....60%
C. E. Jennings & Co.....60&10%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Patent..50%
P., S. & W. Co Peck's Patent.....
60&10@65&5%

Brackets—

Wrought Steel.....75&5@75&10%
Bradley's Wire Shelf:
Full cases.....80%
Broken cases.....75&10%
Griffin's Pressed Steel.....75%
Griffin's Folding Brackets.....70&10%

Bright Wire Goods—See *Wire and Wire Goods.*

Broilers—

Wire Goods Co.....75%

Buckets, Well and Fire—See *Pails*

Bucks, Saw—

Boss.....₩ gro. $48.00
Hoosier.....₩ gro. $36.00

Bull Rings—See *Rings, Bull.*

Butts—Brass—

Wrought list Sept., '96.....40@40&5%
Cast Brass, Tiebout's.....50%

Cast Iron—

Fast Joint, Broad.....50@50&10%
Fast Joint, Narrow.....50@50&10%
Loose Joint.....70&5@70&10%
Loose Pin.....70&5@70&10%
Mayer's Hinges.....70&5@70&10%
Parliament Butts.....70&5@70&10%

Wrought Steel—

Table and Back Flaps...60&10%
Narrow and Broad.....60&10%
Inside Blind.....66⅔%
Loose Pin.....60&10%
Loose Pin, Ball and Steeple Tip.....70&10%
Japanned, Ball Tip Butts...60%

Extra 25@25&5%

Bronzed Wrt. Nar. and Inside Blind Butts.....45&20@45&25%

Cages, Bird—

Hendryx, Brass:
3000, 5000, 1100 series.....5%
1200 series.....33⅓%
200, 300, 600 and 900 series.....40&10%
Hendryx Bronze:
700, 800 series.....40&10%
Hendryx Enameled.....40&10%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong.....per lb..3¼@4c
Sharp, 1 prong.....per lb... 4@4¼c
Perkins' Blunt Toe.....₩ lb 3½¢
Perkins' Sharp Toe.....₩ lb 4 ¢

Can Openers—See *Openers, Can*

Cans, Milk—

	5	8	10 gal.	
Illinois Pattern.	$1 75	2.10	2.25	each.
Iowa Pattern...	....	2.40	2.60	each.
Buffalo Pattern.	....	2.80	2.50	each.
	20	30	40	qts.
New York Patt'rn	3.00	3.25	3.40	each.
Baltimore Patt'rn	2.50	2.85	3.10	each.

Cans, Oil—

Buffalo Family Oil Cans:

3	5	10 gal.
$48.00	60.00	108 gro

Caps—Percussion—

Eley's E. B.....60c
G. D.....per M 32@34c
F. L.....per M 37@40c
G. E.....per M 47@50c
Musket.....per M 57@60c

Primers—

Berdan Primers, $1.00.....5%
B. L Caps (Sturtevant Shells) $1.00.....5%
All other primers.....$1.10@$1.15

Carpet Stretchers—See *Stretchers, Carpet.*

Cartridges—

Blank Cartridges:
32 C. F., $5.50 ..... 10&5@10&10%
38 C. F., $7.00 ..... 10&5@10&10%
22 cal. Rim, $1.50 ..... 10&5@10&10%
32 cal. Rim, $2.75 ..... 10&5@10&10%
B. B. Caps, Con...Ball Swgd. $1.80@1.85
B. B Caps, Round Ball... $1.10@1.15
Central Fire ..... 25@5&5%
Pistol and Rifle ..... 15&5@15&10%
Primed Shells and Bullets ..... 15&5@15&10%
Rim Fire Sporting ..... 50@50&5%
Rim Fire, Military ..... 15&5@15&10%

Casters—

Bed ..... 70@70&10%
Plate ..... 75@75&10%
Philadelphia ..... 75@75&10%
Boss ..... 70&10%
Boss Anti-Friction ..... 70&10%
Martin's Patent (Phœnix) 45%
Payson's Anti-Friction ..... 70&10&10%
Standard Ball Bearing 45%
Tucker's Patent, low list 80%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Coil—

American Coil, Cask lots:

3-16	*¼*	*5-16*	*⅜*	*7-16*	*½*	*9-16*
8.00	*6.00*	*5.00*	*4.25*	*4.10*	*4.00*	*4.05*
¼	*⅝ to 1 in.*				*1¼ to 1¾ inch.*	
3.85	*3.80*				*3.75 per 100 lb.*	

Less than Cask lots add 25c.
German Coil, list July 24, '97. 60&10@10%

Halters and Ties—

Halter Chains ..... 50@10%
German Halter Chain, list July 24, '97 ..... 60&10@10%
Cow Ties 60%

Trace, Wagon, &c.—

Traces, Western Standard: 100 pair
6½—6-2, Straight, with ring...$30.00
6½—6-2, Straight, with ring.. $31.00
6½—8-2, Straight, with ring.. $35.00
6¼—10-2, Straight, with ring..$38.00
Add 2¢ per pair for Hooks.
Twist Traces 2¢ per pair higher than Straight Link.
Trace, Wagon and Fancy Chains... 50&10@50&10@5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron ..... 60@60&10%
Brass ..... 60@60&10%
Safety Chain ..... 70&5@70&10%
Gal. Pump Chain ..... lb. 4@4½c
Covert Mfg. Co.:
Breast ..... 35&2%
Halter ..... 35&2%
Heel ..... 35&2%
Hein ..... 35&2%
Stallion ..... 35&2%
Covert Sad. Works:
Breast 70%
Halter 70%
Hold Back 70%
Rein 70%
Oneida Community:
Am. Coil and Halters ..... 40@45&5%
Am. Cow Ties ..... 45@50%
Eureka Coil and Halter ..... 50@50&5%
Niagara Coil and Halter ..... 45@50&5%
Niagara Cow Ties ..... 45&5@50&10&5%
Wire Dog Chains ..... 45@50&5%
Wire Goods Co.:
Dog Chain ..... 60&10%
Universal Dbl-Jointed Chain 50%

Chalk—(From Jobbers.)

Carpenters' Blue ..... *gro. 42@45c*
Carpenters', Red ..... *gro. 37@40c*
Carpenters', White ..... *gro. 33@35c*
See also Crayons.

Chalk Lines—See *Lines.*

Checks, Door—

Bardsley's ..... 40&10%
Columbia ..... 50&10%
Eclipse ..... 60@60&10%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools 55%
Youths' Chests, with Tools 40%
Gentlemens' Chests, with Tools 30%
Farmers', Carpenters', etc., Chests, with Tools 30%
Machinists' and Pipe Fitters' Chests, Empty 50%
C. E. Jennings & Co.'s Machinists' Tool Chests 30%

Chisels—

Socket Framing and Firmer

Standard List ..... 70@5@7 &10%
Buck Bros 30%
Charles Buck 30%
C. E. Jennings & Co. Socket Firmer No. 10 ..... 60&10%
C. E. Jennings & Co. Socket Framing No. 15 ..... 60&10%
Swan's ..... 70&5%
L. & I. J. White ..... 30&30&5%

Tanged—

Tanged Firmers ..... 40@45&10%
Buck Bros 30%
Charles Buck 30%
C. E. Jennings & Co Nos. 19, 181, ... 25%
L. & I. J. White, Tanged ..... 25&5%

Cold—

Cold Chisels, good quality lb. 12@15c
Cold Chisels, fair quality...lb. 11@12c
Cold Chisels, ordinary ..... *lb. 8@9c*

Chucks—

Beach Pat., each $8.00 ..... 20%
Massey's Planer and Milling ..... 15@20%
Skinner Patent Chucks:
Combination Lathe Chucks 40%
Drill Chucks, Patent and Standard 30%
Drill Chucks, New Model 2½%
Independent Lathe Chucks 40%
Improved Planer Chucks 25%
Universal Lathe Chucks 40%
Face Plate Jaws 40%
Standard Tool Co.:
Improved Drill Chuck 45%
Union Mfg. Co.:
Combination 40%
Cear Drill 30%
Geared Scroll 30%
Independent 40%
Union Drill 30%
Universal 40%
Face Plate Jaws 30%

Clamps—

Adjustable, Hammers' ..... 20@20&5%
Cabinet, Sargent's ..... 50&10%
Carriage Makers', P., S. & W. Co. 40&10%
Carriage Makers' Sargent's ..... 50&10%
Beaty, Parallel ..... 33⅓&10%
Lineman's, Utica Drop Forge & Tool Co 40%
Saw Clamps, see *Vises, Saw Filers'.*

Cleaners, Sidewalk—

Star Socket, All Steel ..... ₱ doz. $4.00 net
Star Shank, All Steel ..... ₱ doz. $3.75 net
W. & B. Shank, All steel, 7¼ in. ₱ doz., $3.05; 8 in., $3.10; 8½ in., $3.25.

Cleavers, Butchers'—

Foster Bros 30%
New Haven Edge Tool Co.'s 40%
Fayette R. Plumb ..... 33⅓&33⅓&10%
P., S & W ..... 50@50&5%
L. & I. J. White 25%

Clippers—

Chicago Flexible Shaft Company
Handy Toilet ..... ₱ doz. $7.20
Mascotte Toilet ..... ₱ doz. $8.40
Monitor Toilet ..... ₱ doz. $9.00
Stewart's Patent ..... ₱ doz. $10.00

Clips Axle—

Eagle and Superior ¼ and 5-16 inch ..... 70@10%
Norway, ½ and 5-16 inch...70@70&10%

Cloth and Netting, Wire—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Compression and Plain Bibbs ..... 65&5%
Globe, Kerosene, Racking, &c., Cocks ..... 65&10%

Coffee Mills—See *Mills, Coffee.*

Collars, Dog—

Brass, Pope & Stevens' list 40%
Embossed Gilt, Pope & Stevens' list 30&10%
Leather Pope & Stevens' list 40%

Compasses, Dividers, &c.

Ordinary Goods ..... 70@10@75%
Bemis & Call Hdw. & Tool Co.:
Dividers 65%
Calipers, Call's Patent Inside 55%
Calipers, Double 65%
Calipers, Inside or Outside 65%
Calipers, Wing 60%
Compasses 50%
J. Stevens A. & T. Co ..... 25&10%

Compressors, Corn Shock—

J. R. Huches' ₱ doz $2.50

Conductor Pipe, Galva.—

L. C. L. to Dealers:

Territory.	*Not nested.*	*Nested.*
Eastern	*70@2½%*	*70@5%*
Central....	*65@10%*	*70%*
Southern..	*65%*	*65@2½%*
S. Western.	*60@12½%*	*60@15%*

Terms 2% for cash.
Jobbers receive extra 12½@2½ on carloads loose, and extra 12½ on carloads crated.
See also *Eave Troughs.*

Coolers, Water—

Nos....	2	3	4	6
Labrador	$11.50	$14.00	$17.50	$20.00
8 gal.	$2 .00			
No..	3	4	6	8
Iceland..	$23.00	$25.00	$30.00	$37.50
10	14 gal.			
$57.00	$72.00			

Coopers' Tools—

See *Tools, Coopers'.*

Cord—Sash—

Braided, Drab ..... *lb. 25c*
Braided, White, Common..lb. 17@18c
Cable Laid Italian...lb. A, 18c; B, 16c
Common India ..... *lb 9 @9½c*
Cotton Sash Cord, Twisted....12@16c
Patent Russia ..... *lb. 12½@13c*
Cable Laid Fussia ..... *lb. 13½@14c*
India Hemp, Braided ..... *lb 14@15c*
India Hemp, Twisted ..... *lb. 10@12c*
Patent India, Twisted ..... *lb.10@12c*
Pearl Braided, cotton ..... ₱ ℔ 17@18¢
Massachusetts, White ..... ₱ ℔ 23½¢
Massachusetts, Drab ..... ₱ ℔ 26½¢
Eddystone Braided Cotton ..... ₱ ℔ 19¢
Harmony Cable Laid Italian ..... ₱ ℔ 18¢
Ossawan Mills:
Crown, Solid Braided White ..... ₱ ℔ 22¢
Braided, Giant, White ..... ₱ ℔ 20¢
Peerless:
Cable Laid Italian ..... 16¢
Cable Laid Russian ..... 14¢
Cable Laid India ..... 12¢
Braided India ..... 18¢
Phœnix, White ..... 19¢
Samson, Nos. 7 to 12:
Braided, Drab Cotton ..... ₱ ℔ 32½¢
Braided, Italian Hemp ..... ₱ ℔ 32½¢
Braided, Linen ..... ₱ ℔ 49¢
Braided, White Cotton, Spot. ₱ ℔ 28½¢
No. 6 cords, 1¢ extra.
Silver Lake:
A quality, Drab, 40¢ 15%
A quality, White, 35¢ 15%
B quality, Drab, 35¢ 15%
B quality, White, 30¢ 15%
Italian Hemp, 40¢ 15%
Linen, 57½¢ 15%

Wire, Picture—

Braided or Twisted ..... *85@85&10%*
Note.—There is a good deal of confusion in lists, some using old list and others the new list.

Corn Knives and Cutters—See *Knives, Corn.*

Corn Planters—See *Planters, Corn—*

Crackers, Nut—

Little Giant, ... ₱ gr. $24.00

Cradles—

Grain 50%

Crayons—

White Round Crayons, gross 5½@6c
Cases, 100 gro., $4.50, at factory.
D. M. Steward Mfg. Co.
Metal Workers' Crayons gr. $2.50
Soapstone Pencils, round, flat or square ..... gr. $1.50
Rolling Mill Crayons ..... gr. $2.50
Railroad Crayons (composition) gr. $2.00
Case lots 25%
See also *Chalk.*

Creamery Pails—See *Pails, Creamery.*

Crooks, Shepherds'—

Fort Madison, Heavy ..... ₱ doz. $7.00
Fort Madison, Light ..... ₱ doz. $4.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden ..... ₱ doz. $10.00

Cutlery, Table—

International Silver Company:
No. 12 Medium Knives, 1847. ₱ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor ..... ₱ doz $3.00
Wm. Rogers & Son ..... ₱ doz. $2.50
Simeon L. & Geo H. Rogers Company:
12 dwt. Medium Knives ..... ₱ doz. $3.00
No. 77 Medium Knives ..... ₱ doz. $2.50

Cutters—Glass—

H. H. Mayhew Co 40%
Smith & Hemingway Co 50%

Meat—

Hale's...Nos. 11 & 111 12 & 112 13 & 113
Per doz .. $9.50 12.50 16.00
American 30%

Nos	1	2	3	4	5
Each	$5	$7	$10	$25	$50	$60

Connecticut 50%

Nos	20	40	60	8	10	12
Each	$1.75	2.00	2.25	3.00	3.00	4.00

Enterprise ..... 25@35&7½%

Nos	5	10	12	22	32
Each	$2	$3	$3.50	$4	$6

Dixon's, ₱ doz ..... 30&10@40%

Nos..	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Home No. 1, ₱ doz. $22.75 ..... 50&10%
Little Giant, ₱ doz ..... 33⅓&5@40%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$75.00	$68.00

Sterling ..... 33⅓&5%

Nos	1	2
Each	$3.00	$2.50

New Triumph No. 605, ₱ doz. $24.00 .. 30&10@40%
Woodruff's, ₱ doz ..... 30&10@40%

Nos	100	150
	$15.00	$18.00

Chadborn's Smoked Beef Cutter, ₱ doz. $60.00
Enterprise Beef Shavers ..... 25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw, Corn Grater, &c 40%
Kraut Cutters 24 x 7, 36 x 8, 30 x 9 55%
Kraut Cutters 36 x 12, 40 x 12 ..... 40%
Tucker & Dorsey Mfg. Co.:
Kraut Cutters 40%
Slaw Cutters, 1 Knife, ₱ gr. ..... $19@$30
Slaw Cutters, 2 Knife, ₱ gr. ..... $22@$36

Tobacco—

All Iron, Cheap ..... *doz. $4.25@$4.50*
Enterprise ..... 25@50%
National, ₱ doz. $21.00 ..... 40%
Sargent's, ₱ doz., No. 2 ..... 45&10%
Sargent's No 12 and 21 ..... 50&10%

Washer—

Appleton's, ₱ doz. $16.00 ..... 50&10&10%
Bonney's 40%

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger...per doz., $9.00
Iwan's Improved Post Hole Auger.... 40%
Iwan's Perfection Post Hole Digger.... ₱ doz. $9.00
Kohler's Universal ..... ₱ doz. $14.00
Kohler's Little Giant ..... ₱ doz. $14.00
Kohler's Hercules ..... ₱ doz. $12.00
Kohler's Invincible ..... ₱ doz. $10.00
Kohler's Rival ..... ₱ doz. $9.00
Kohler's Pioneer ..... ₱ doz. $9.00
Never Break Post Hole Diggers, ₱ doz. $24.00 ..... 60%
Samson, ₱ dos. $34.00 ..... 25%

Dividers—See *Compasses.*

Dog Collars—See *Collars, Dog.*

Door Checks—See *Checks, Door.*

Door Springs—See *Springs, Door.*

Doors, Screen—

Porter's Plain, No. 6 ..... ₱ doz. $6.50
Porter's Ornamental, No. 70. ₱ doz. $10.00

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, ₱ doz. $18; No. 2, $15; No. 3, $14; No. 4, $18.

Drawing Knives—See *Knives, Drawing.*

Drills and Drill Stocks—

Common Blacksmiths' Drill..each $1.50@$1.75
Blacksmiths' Self-feeding.....each $3.75@$4.00
Breast, Millers Falls, each $3.00 ..15&10%
Breast, P., S. & W ..... 40@40&5%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills Nos. 2 and 3 ..... 16⅔%
Johnson's Drill Points ..... 25&10%
Ratchet, Curtis & Curtis 25%
Ratchet, Parker's 40%
Ratchet, Weston's ..... 20@25%
Ratchet, Whitney's, P. S. & W 50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00 ..... 33⅓%

Twist Drills—

Standard List ..... *60&5@65&5%*

Drill Bits or Bit Stock Drills—See *Augers and Bits.*

Drill Chucks—See *Chucks.*

Dripping Pans—See *Pans, Dripping.*

Drivers, Screw—

Screw Driver Bits...per doz. 45@70c
Balsey's Screw Holder and Driver, ₱ doz. 2½-inch, $6; 4-in., $7.50 6-in., $9..40%
Buck Bros 30%
Buck Bros' Screw Driver Bits 30%
Champion ..... 40&10%
Douglass Mfg. Co ..... 20@20&10%
Fray's Hol. Riddle Sets, No. 8, $12.00 50%
Gay's Double Action Ratchet 35%
Goodell's Automatic ..... 50&10&10@50&10&10&5%
Mayhew's Black Handle 50%
Mayhew's Monarch ..... 40&10%
New England Specialty Co ..... 50&10%
Sargent & Co.'s:
Nos. 1, 50, 55 and 60 ..... 50&10&10%
Nos. 20 and 40 ..... 60%&10%
Smith & Hemenway Co ..... 40&5%
Stanley's R. & L. Co.'s:
No. 64, Varnished Handles ..... 60&10%
No. 86 ..... 70&10%
Swan's:
Nos. 65 to 68 ..... 50%
No. 40 ..... 40&10%
Nos. 35, 35 and 45 ..... 30&10&10%

Eave Trough Galvanized

Territory.	*L. C. L.*	
Eastern	*75&10%*	Carloads extra 12½%
Central.....	*75&17½%*	
Southern.....	*70&12½%*	
S. Western.....	*70&10%*	

Terms, 2% for cash.
See also *Conductor Pipe and Elbows.*

Egg Beaters—See *Beaters, Egg*

Egg Openers—See *Openers, Egg.*

Elbows and Shoes—

Factory shipments ..... 60@60&10%
Perfect Elbows (S. S. & Co.) 40%

Emery, Turkish—

4 to 16 8 to 150 Flour

Kegs	*lb.*	*5c*	*5½c*	*5½c*
¼ Kegs	*lb.*	*5½c*	*5¾c*	*5¾c*
Kegs	*lb*	*5c*	*6c*	*6c*

10-lb cans, 10 in case 6½c 7c 6c
10-lb cans, less than 10 10c 10c 8c
Note.—In lots 1 to 3 tons a discount of 10¢ is given.

Enameled and Tinned Ware—See *Ware, Hollow.*

Escutcheon Pins—See *Pins, Escutcheon.*

Extractors, Lemon Juice—See *Squeezers, Lemon.*

Fasteners, Blind—

Zimmerman's ..... 50&10%

Faucets—

Cork Lined ..... 70@5@70&10@5%
Metallic Key, Leather Lined ..... 70@70@10%
Red Cedar ..... 50@50@10%
B. & L. B. Co.:
Lockport, Metal Plug, reduced list 60&5%
Star ..... 60@60@5%
Star, Metal Plug new list.... 40@40&5%
West's Lock, Open and Shut Key 50&10%
John Sommer's Peerless Tin Key.... 40%
John Sommer's Boss Tin Key 50%
John Sommer's Victor Metal Key. 50&10%
John Sommer's Duplex Metal Key.... 60%
John Sommer's Diamond Lock 40%
John Sommer's I. X. L. Cork Lined.. 50%
John Sommer's Reliable Cork Lined ..... 50&10%
John Sommer's Chicago Cork Lined.. 60%
John Sommer's O. K. Cork Lined..... 50%
John Sommer's No Brand, Cedar..... 50%
John Sommer's Perfection Cedar.... 40%
McKenna, Brass:
Burglar Proof, N. P 35%
Improved, ¾ and ⅞ inch 35%
Self Measuring:
Enterprise, ₱ doz. $36.00 ..... 40&10%
Lane's, ₱ doz. $36.00 ..... 40&10%
National Measuring, ₱ doz. $36.00.. 40%

Felloe Plates—See *Plates, Felloe.*

Files—Domestic—

List revised Nov. 1, 1899.
Best Brands ..... 70@75&5%
Good Brands ..... 75&10@75&10&10%
Fair Brands ..... 80@80&10%
Second Quality ..... 80&10@80&25%

Imported—

Stubs' Tapers, Stubs' list, July 24, '97 ..... 25%

Fixtures, Grindstone—

Net Prices:

Inch....	*15*	*17*	*19*	*21*	*24*
Per doz.	*$2.60*	*$3.75*	*5.00*	*$ 50*	*$ 50*

P., S. & W. Co ..... 50@50&5%
Reading Hardware Co 60%
Sargent's ..... 60&10&10%
Stowell's Giant Grindstone Hanger ..... ₱ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy ..... 50&10&10%
Stowell's Grindstone Fixtures Light.. 60&10%

Fodder Squeezers—See *Compressors.*

Forks—

Sept. 1, 1900, list.
Grain or Barley Forks, 18 to 20 inches ..... *70@6%*
Hay, 2 tine *62½%*
Hay, 3 tine *66⅔%*
Hay, 4 tine, Header and Barley Forks, 13 to 16 inches.....66⅔%
Manure, 4 tine *70%*
Manure, 5 and 6 tine *70%*
Spading ..... *70@5%*
Extra 10%
Iowa Dig-Ezy Potato 65%
Victor, Hay 66⅔%
Victor, Manure 70%
Victor, Header ..... 60&10%
Champion, Hay 66⅔%
Champion, Manure 70%
Columbia, Hay ..... 66⅔&5%
Columbia, Manure 70%
Columbia, Spading 70%
Hawkeye Wood Barley 4 tine ₱ doz. $5.00; 6 tine, $6.00.
W. & C. Potato Digger 65%
Acme Hay ..... 60&10&7½%
Acme Manure, 4 tine ..... 60&20&10%
Acme Manure, 6 tine ..... 60&5&10&2%
Dakota Header ..... 45&15&5%
Jackson Steel Barley ..... 65&15&5%
Kansas Header 60%
W. & C. Favorite Wood Barley 4 tine, ₱ doz., $5.00; 6 tine, $6.00
Plated.—See *Spoons.*

Frames—Saw—

Red, Polished and Varnished..doz. $1.15@$1.85
White ..... *doz. 75@80c*

Screens and Frames—See *Screens.*

Freezers, Ice Cream—

Qts...	*3*	*4*	*6*	*8*	*10*
Best.	*$1.45*	*1.65*	*1.95*	*2.40*	*3.30*	*4.20*
Good	*$1.25*	*1.40*	*1.70*	*2.15*	*2.75*	*3.75*
Fair.	*$1.00*	*1.10*	*1.30*	*1.75*	*2.50*	*3.50*

Fruit and Jelly Presses—See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse—*Per 1000 Feet.*

Hemp Fuse *$2.00*
Cotton Fuse *2.50*
Single Taped Fuse *3.25*
Double Taped Fuse *4.50*
Triple Taped Fuse *6.00*
100&5%

Gates, Molasses and Oil—

Stebbins' ..... 80@80&10%

Gauges—

Marking, Mortise, &c. ..... 55&10@55&10@10%
Barrett's Comb. Roller Gauge ..... ₱ doz. $6.75@7.25
Stanley R. & L. Co.'s Butt & Babbet Gauge ..... 20&10%
Wire, Brown & Sharpe's 25%
Wire, Morse's 25%
Wire P. S. & W. Co ..... 30@30&10%

Cimlets— Single Cut—

Nail, Metal, Assorted, gro. $1.40@1.60
Spike, Metal, Assorted gro. $2.80@3.25
Nail, Wood Handled, Assorted, gro. $1.75@2.00
Spike, Wood Handled, Assorted gro. $3.25@3.50

Glass, American Window

Jobbers' List, Jan. 21, 1901.
See Trade Report.

Glue—Liquid, Fish—

List A, Bottles or Cans, with Brush. 37½@50%
List B, Cans (¼ pts., pts., qts.) ..... 33 3@38%
List C, Cans (½ gal., gal.) ..... 25@45%
International Glue Co. (Martin's) ..... 40&10@50%

Glue Pots—See *Pots, Glue.*

Grease, Axle—

Common Grade ..... *gro. $5.00@6.00*
Dixon's Everlasting ..... 10-lb pails, ea. 85¢
Dixon's Everlasting, in bxs., ₱ doz. 1 lb ..... $1.20; 2 lb $2.00
Snow Flake: 1 qt. cans, per doz. $2.00; 2 qt., $3.20; 1 gal. cans per doz. $6.00; 3 gal. $16.00; 5 gal. $24.00 } 10%

Grindstones—

Bicycle Emery Grinder $6.50
Bicycle Grindstones, each ..... $2.50@3.00
Pike Mfg. Co: Improved Family Grindstones, per inch, per doz. ..... $2.00 } 33⅓%
Pike Mowe Knife and Tool Grinder, each $4.00
Velox Ball Bearing, mounted, Angle Iron Frames ..... each, $3.25

Guards, Snow—

Cleveland Wire Spring Co.: Galv. Steel ₱ 1000 ..... $9.00
Copper ₱ 1000 ..... $18.00

Gun Powder—See *Powder.*

Hack Saws—See *Saws.*

Hafts Awl— gro.

Peg Patent, Leather Top ..... *$4.80@5.25*
Peg Patent, Plain Top ..... *$3.50@3.75*
Sewing, Brass Ferrule ..... *$1.50@1.60*
Saddlers', Brass Ferrule ..... *$1.35@1.45*
Pea, Common ..... *$1.25@1.35*
Brad, Common ..... *$1.50@1.75*

Halters and Ties—

Covert Mfg. Co.:
Web ..... 45&2%
Jute Rope ..... 45&2%
Sisal Rope ..... 30&2%
Covert's Saddlery Works:
Web and Leather Halters 70%
Jute and Manila Rope Halters 70%
Sisal Rope Halters ..... 60&20%
Jute, Manila and Cotton Rope Ties 70%
Sisal Rope Ties ..... 60&20%

Hammers—

Handled Hammers—

Heller's Machinists' ..... 50@50&5%
Heller's Farriers ..... 50@50&5%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75 ..... 40&10%
Peck, Stow & Wilcox ..... 50&10%
Fayette R. Plumb: Plumb, A. E. Nail ..... 33⅓&5@33⅓&10&5%
Engineers' and B. S. Hand ..... 50&10&7½@50&10&10&7½%
Machinists' Hammers ..... 5&10@50&10&10%
Riveting and Tinners' ..... 40&7½@40&10&7½%
Sargent's C. S. New List 45%

Heavy Hammers and Sledges—

3 lb. and under ..... *lb. 45c*
3 to 5 lb ..... *lb. 35c* } 30@30&10%
Over 5 lb ..... *lb. 30c*
Wilkinson's Smiths' ..... *9½c@10c lb.*

Handcuffs and Leg Irons

See Police Goods.

Handles—

Agricultural Tool Handles—

Axe, Pick, &c ..... *60@60&10%*
Hoe Rake, Fork, &c ..... *60@60&10%*
Shovel, &c., Wood D Handle ..... *50@50&5%*

Cross-Cut Saw Handles—

Atkins' ..... 40&5%
Champion ..... 45@45&10%
Disston's 50%

Mechanics' Tool Handles—

Auger, assorted ..... *gro. $2.30@2.50*
Brad Awl ..... *gro. $1.25@1.50*
Chisel Handles:
Apple Tanged Firmer, gro. ass'd. $2.25@2.35; large, $2.50@2.60.
Hickory Tanged Firmer, gro ass'd $1.75@2.20; large, $3.50@3.70.
Apple Socket Firmer, gro ass'd, $1.70@1.85; large, $2.00@2.25
Hickory Socket Firmer, gro ass'd. $1.60 @ $1.75; large, $1.75 @ $2.00
Hickory Socket Framing, gro, ass'd. $2.50@2.75; large, $2.65@2.85
File, assorted ..... *gro. $1.60@1.15*
Hammer, Hatchet, Axe, &c *60%*
Hand Saw, Varnished, doz. 70@75c
Not Varnished ..... *55@60c*
Plane Handles:
Jack, doz. 25c; Jack Bolted ..... *55@60c*
Fore, doz. 35@38c; Fore, Bolted ..... *70@75c*
Nicholson Simplicity File Handle, ₱ gro. ..... $0.8 @$1.50

Hangers—

Barn Door, New Pattern, Round Groove, Regular:

Inch	3	4	5	6	8
Doz	$0.85	1.20	1.50	1.90	2.50

Barn Door, New England Pattern, Check Back, Regular:

Inch	3	4	5	6
Doz	$1.50	1.75	2.50	3.00

Chicago Spring Butt Co.: Friction 25%
Oscillating 25%
Big Twin 25%
Chisholm & Moore Mfg. Co.: Baggage Car Door 50%
Elevator 40%
Railroad 55%
Cronk Hanger Co.: Loose Axle 60%
Roller Bearing ..... 60&10%
Lane Bros.: Parlor, Ball Bearing $4.00
Parlor, Standard $3.25
Parlor, New Model $2.75
Parlor New Champion $2.25
Barn Door, Standard ..... 60&10%
Covered ..... 50&10&10&5%
Special ..... 60&10%
Lawrence Bros.: Advance 60%
Cleveland 70%
Crown 60%
New York 60%
Peerless ..... 60&10%
Sterling 60%
McKinney Mfg. Co.: No. 1 Special, $15 ..... 60&10%
No. 2, Standard, $18 ..... 60&10%
Stowell Mfg. and Foundry Co.: Acme Parlor Ball Bearing 40%
Atlas 60%
Badger Barn Door 50%
Baggage Car Door 50%
Climax Anti-Friction 50%
Elevator 40%
Express 50%
Interstate 40%
Lundy Parlor Door 50%
Magic 50%
Matchless 60%
Nansen ..... 60&10%
Railroad 50%
Street Car Door 50%
Steel, Nos. 300, 401, 500 ..... 40&15%
Stowell Parlor Door 50%
Wild West, Nos. 301, 401, 500 ..... 5%
Zenith for Wood Track 50%
Taylor & Boggis Foundry Co.: Kidder's ..... 50&15&10&5%
Columbian Hdw. Co.: American Trackless ..... 33⅓&10%
Wilcox Mfg. Co.: Bike Roller Bearing ..... 60&10%
C. J. Roller Bearing ..... 60&10%
Cycle Ball Bearing 50%
Dwarf Ball Bearing 40%
Ives, Wood Track ..... 60&10%
L. T. Roller Bearing ..... 60&10&5%
New Era Roller Bearing ..... 50&10%
O. K. Roller Bearing ..... 60&10&5%
Prindle, Wood Track 60%
Richards' Wood Track 60%
Richards' Steel Track ..... 50&10%
Spencer Ball Bearing ..... 60&10%
Tandem Nos. 1 and 2 ..... 60%
Underwriters' Roller Bearing 40%
Wilcox Auditorium Ball Bearing 30%
Wilcox Barn Trolley No. 123 ..... 40%
Wilcox Fire Trolley, Roller Bearing 30%
Wilcox Le Roy Noiseless Ball Bearing 40%
Wilcox New Century ..... 50&10&10%
Wilcox Trolley Ball Bearing 40%

Extra 5@10% often given.

Harness Menders—See *Menders.*

Harness Snaps—See *Snaps.*

Hasps—

McKinney's Perfect Hasp ₱ doz. 50%
Wrought Hasps, Staples, &c.—See *Wrought Goods.*

Hatchets—

Best Brands ..... *60@50&10%*
Cheaper Brands ..... *60@60&10%*
Note.—Net prices often made.

Hay and Straw Knives—

See *Knives.*

Hinges—

Blind and Shutter Hinges—

Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	1	3	5
Doz. pair	$0.75	1.45	2.90

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.	1	1½	2	2½
Doz. pair	$0.60	.55	.52	.45

Mortise Reversible Shutter, (Buffalo, &c.)

No.	1	1½	2
Doz. pair	$0.85	.60	.55

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50 ..... 10%
Parker ..... 70@75%
Reading's Gravity ..... 70&10%
Sargent's, Nos. 1, 3, 5, 11 & 13 ..... 70&10@70&20%
Stanley's Steel Gravity Blind Hinges, ₱ doz. sets, without screws, $0.80; with screws, $1.15.
Wrightsville H'dware Co.: O. S., Lull & Porter ..... 80&2½%
Acme, Lull & Porter ..... 75&10%
Queen City Reversible ..... 75&10%
Stenger's Positive Locking, Nos. 1 & 3 ..... 70&10&5%
Shepard's Noiseless, Nos. 60, 65, 55 ..... 70&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5 ..... 75&7½%
1868, Old Pat'n. Nos. 1, 3 & 5 ..... 75&7½%
Tip Pat'n, Nos. 1, 3 & 5 ..... 75&7½%
Buffalo Gravity Locking, Nos. 1, 3 & 5 ..... 75&7½%
Shepard's Double Locking, Nos. 20 & 25 ..... 70&10%
Champion Gravity Locking, No. 75 ..... 75&7½%
Steamboat Gravity Locking, No. 10 ..... 75&7½%
Pioneer, Nos. 060, 45 & 5½ ..... 75&7½%
Empire, Nos. 101 & 103 ..... 70&7½%
W. H. Co.'s Mortise Gravity Locking, No. 2 ..... 40&10%

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No.	1	2	3
Hinges with Latches	$1.85	1.90	2.65
Hinges only	$1.20	1.45	2.00
Latches only	.60	.80	.65

New England:
With Latch ..... *doz* ..... *@$1.55*
Without Latch ..... *doz.* ..... *@$1.25*
Reversible Self-Closing:
With Latch ..... *doz.* ..... *@$1.80*
Without Latch ..... *doz.* ..... *@$1.45*
Western:
With Latch ..... *doz. $1.40@1.75*
Without Latch ..... *doz. $0.95@1.30*
Wrightsville H'dware Co.: Shepard's or Clark's, doz. sets,

No.	1	2	3
Hinges with Latches	$1.80	2.00	2.75
Hinges only	1.20	1.50	2.10
Latches only	.65	.65	.70

Spring Hinges—

Holdback, Cast Iron ..... *gro. $7.00@7.85*
Non-Holdback, Cast Iron ..... *gro. $6.50@6.75*

J. Bardsley: Bardsley's Patent Checking 15%
Bommer Bros.: Bommer Ball Bearing Floor Hinges 40%
Bommer Spring Hinges 40%
Chicago Spring Butt Co.: Chicago 25%
Floor Hinge 50%
Garden City Engine House 25%
Keene's Saloon Door 25%
Triple End 50%
Hoffman Hinge & Foundry Co.: No. 70 & 80 Holdback Detachable $8.50
Lawson Mfg. Co.: Machine 35%
Matchless Pivot 45%
Payson Mfg. Co.: Oblique ..... 50&10%
Stover Mfg. Co.: Ideal, No. 16, Detachable, ₱ gr. $12.50
Ideal, No. 4 ..... ₱ gr. $9.00
New Idea No. 1 ..... ₱ gr. $9.00
New Idea, Double Acting 45%
Columbian Hdw. Co.: Acme, Cast Steel 30%
Acme, Brass 20%
American 30%
Columbia, No. 14 ..... ₱ gr. $9.00
Columbia, No. 18 ..... ₱ gr. $25.00
Columbia, Adjustable 30%
Gem new list 25%
Clover Leaf ..... ₱ gr. $12.50
Oxford new list 25%

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges, &c., list Mar. 15, 1901:
Light Strap Hinges *75%*
Heavy Strap Hinges *80%*
Light T Hinges *70%*
Heavy T Hinges *66⅔%*
Extra Heavy T Hinges ..... *75&10%* } *Extra 10@25%*
Hinge Hasps *60%*
Cor. Heavy Strap *80%*
Cor. Ex. Heavy T ..... *75&10%*
Screw Hook and Strap. { *6 to 12 in.* ..... *lb 3½c* / *14 to 20 in* ..... *lb. 3 c* / *22 to 36 in* ..... *lb 2¾c*
Screw Hook and Eye:
¾ to 1 inch ..... *lb 5 c*
⅝-inch ..... *lb 6 c*
½-inch ..... *lb. 7 c*

Miscellaneous—

Hoffman's Steel Spring Butt Hinges ..... 40&10%
Hoffman's Offset Refrigerator Hinges ..... 40&10%

Hods, Coal—

	15 inch.	*16*	*17*	*18*
Galv. Open	$2.70	3.00	3.30	3.60 ₱ doz.
Jap. Open	$2.10	2.40	2.70	3.00 ₱ doz.
Galv. Funnel	$3.30	3.60	3.90	4.20 ₱ doz.
Jap. Funnel	$2.70	3.00	3.30	3.60 ₱ doz.

Hoes— Eye—

Scovil and Oval Pattern ..... *60@5@60@10@5%*
Grub, list Feb. 23, 1899 ..... 70@70@10%
D. & H. Scovil 35%

Handled—

Sept. 1, 1900, List:
Field and Garden ..... *75@2%*
Ladies', Boys', Toy and Onion ..... *70@10@10%*
Street and Mortar ..... *75@7½@2%*
Cotton ..... *70@10@10@5@2%*
Planters' ..... *70@30%*
Weeding *75%*
Note.—Manufacturers and jobbers use a diversity of lists, and often sell at net prices.
Ft. Madison Crucible Garden Hoe ..... 75&2%
Ft. Madison Crescent Cultivator Hoe, per doz ..... 75&10&2%
Ft. Madison Maltock Hoes: Regular Weight ..... ₱ doz. $4.50
Junior Size ..... ₱ doz. $4.00
Ft. Madison Sprouting Hoe, ₱ doz. $4.80
Ft. Madison Dixie Tobacco Hoe ..... 75&20%
Kretsinger's Cut Easy, per doz ..... 75&2%
Warren Hoe 60%
W. & C. Ivanhoe ..... 75&2%
B. B. Cultivator Hoe ..... 75&10&2%
Acme Weeding ..... 75&10&2%
W. & C. Lightning Shuffle Hoe, ₱ doz. $4.85

Hog Rings and Ringers—

See *Rings and Ringers.*

Hoisting Apparatus—

See *Machines, Hoisting.*

Hollow Ware—

See *Ware, Hollow.*

Holders— Bolt—

Angular, ₱ doz. $24.00 ..... 45&10%

Door—

Empire 50%

File and Tool—

C. E. Jennings & Co. Model Tool Holders 33⅓%
Nicholson File Holders and File Handles 33⅓%

Hooks— Cast Iron—

Bird Cage, Reading 60%
Bird Cage, Sargent's List ..... 50&10@60%
Ceiling, Sargent's List ..... 40&10%
Clothes Line, Hoffman's ..... 40&10%
Clothes Line, Reading List ..... 65&10@65&10&10%
Clothes Line, Sargent's List ..... 50&10@65&10%
Coat and Hat, Sargent's List ..... 45&10%
Clothes Line, Stowell's 70%
Coat and Hat, Stowell's 70%
Coat and Hat, Reading ..... 70@75%
Coat and Hat, Wrightsville ..... 65&10%
Harness, Reading List ..... 70&10@75%

Wire—

Belt *80%*
Wire C. & H. Hooks ..... *60@10@60@10@5%*
Atlas, Coat and Hat: Single Cases 45%
10 Case Lots ..... 45&10%
Czar Harness ..... 50&10&5%
Wire Coat and Hat: Acme 60%
B. B 60%
V Brace, Chief and Czar 60%
Gem 60%
Bright Wire Goods—See *Wire.*

Wrought Iron—

Box, 6 in., per doz. $1.50; 8 in., $1.75; 10 in., $2.00.
Cotton ..... *doz. $1.05@1.25*
Wrought Staples, Hooks, &c.—See *Wrought Goods.*

Miscellaneous—

Bush, Light, doz. $5.50; Medium, $6.00; Heavy, $6.50

Grass ..... *Nos.*	1	2	3	4
Best	$1.50	1.75	2.00	
Common	$1.20	1.30	1.40	1.60

Potato and Manure *70%*
Whiffletrees ..... *lb. 4½c*
Hooks and Eyes:
Brass ..... *60@10@10@10@7½%*
Malleable Iron ..... *70@5@70@10%*
Covert Saddlery Works' Self Locking Gate and Door Hook 60%
Crown Picture ..... 50&10%
Bench Hooks—See *Bench Stops.*
Corn Hooks—See *Knives, Corn.*

Horse Nails—See *Nails, Horse*

Horseshoes—

See *Shoes, Horse.*

Hose, Rubber—

Garden Hose, ¾-inch:

	ft.			
Competition	4¼@	4¼c		
3-ply Standard	5	@	6	c
4-ply Standard	8	@	9	c
5-ply extra	9	@	10	c
4-ply extra	11	@	12	c

Cotton Garden, ¾-in., coupled:
Low Grade ..... *ft. 6 @7 c*
Fair quality ..... *ft. 8 @9 c*

Irons— Sad—

From 4 to 10 ..... *lb 3@3¼c*
B. B. Sad Irons ..... *lb. 3¼@4c*
Chinese Laundry ..... *lb. 5@5½c*
Chinese Sad ..... *lb. 3½@3¼c*
Mrs. Potts', per set:

Nos.	50	55	60	65
	65@70c	60@65c	75@80c	70@75c

New England Pressing ..... *lb.. 3½@3¾c*

Soldering—

Soldering Coppers, 1 & 1¼ lb., 21 @ 23c.; 2 lb., 19 @ 21c
Covert Mfg. Co. ..... 20&2%
Smith & Hemenway Co's Sets 70%

Pinking—

Pinking Irons ..... *doz. 50@60%*

Jack Screws—See *Screws.*

Jacks, Wagon—

Covert Mfg. Co., Steel ..... 45&2%
Covert's Saddlery Works': Daisy ..... 60&10%
Victor ..... 60&10%
Lockport ..... 40@40&10%
Lane's Steel ..... 33⅓&5%

Kettles—

Brass, Spun, Plain ..... *20@25%*
Enameled and Cast Iron—See *Ware, Hollow.*

Knife Sharpeners—

See *Sharpeners, Knife.*

Knives—

Butcher, Shoe, &c.—

Foster Bros.' Butcher, &c. 30%
Hartzell Cutlery Co. ..... 30&5%
Smith & Hemenway Co ..... 40&10%
Hay and Straw—See *Hay Knives.*

Corn—

Ft. Madison Cut-Easy, ₱ doz. $3.25
Withington Acme, ₱ doz., $2.65; Deut., $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—

Standard List ..... *70&5@70@10%*
Adjustable Handle 25%
Bradley's 35%
Cantelo's Folding ..... 50@50&5%
C. E. Jennings & Co. Nos. 45, 46 ..... 40&10%
Jennings & Grimm ..... 60&5%
Swan's ..... 70&10&2½%
Watrous 25%
L. & I. J. White ..... 20&5@25%

Hay and Straw—

Lightning Pat'n ..... *per doz $5.10*
Iwan's Sickle Edge ..... ₱ doz. $10.00
Iwan's Serrated ..... ₱ doz., $11.00
Lightning, (Genuine) ..... $6.25@6.50
Maine ..... ₱ doz. $8.50

Mincing—

Buffalo ..... ₱ gro. $15.00

Miscellaneous—

Farriers' ..... *doz $2.00@3.00*
Wosenholm's ..... ₱ doz. $3.00@3.25

Knobs—

Base, 2¼-inch, Birch, or Maple. Rubber tip, gro ..... *$1.20@1.25*
Carriage, Jap. all sizes ..... *gro. 30@35c*
Door, Mineral ..... *doz. 60@65c*
Door, Por. Jap'd ..... *doz. 65@70c*
Door, Por. Nickel ..... *doz. $2.00@2.10*
Bardsley's Wood Door, Shutter, &c. 15%
Picture, Sargent's ..... 60&10%

Ladders, Step Etc.—

Goshen Mfg. Co. 50%

Ladles—Melting—

L. & S. Mfg. Co. 25%
P., S. & W. 50%
Reading 60%
Sargent's ..... 40@40&10%

Lanterns—Tubular—

Regular Tubular ..... doz. $4.35@4.75
Side Lift Tubular ..... doz. $4.75@5.25
Square Lift Tubular ..... doz. $4.75@5.25
Other Styles ..... 40@10@40@10@5%

Bull's Eye Police—

No. 1, 2¼ inch $3.60
No. 2, 3 inch $4.00

Latches, Thumb—

Roggin's Latches ..... doz. 50@55c

Lawn Mowers—

See *Mowers, Lawn.*

Leaders—Cattle—

Small ..... doz. 50c; large, 55c
Covert Mfg. Co. ..... 45&2%

Lemon Squeezers—

See *Squeezers, Lemon.*

Lifters, Transom—

Solid Grip, Payson Mfg. Co. 80%
K. & S. 45%

Lines—

Wire Clothes, Nos...	*18*	*19*	*20*
100 feet	*$2.20*	*2.00*	*1.65*
75 feet	*$1.80*	*1.70*	*1.30*

Ossawan Mills.
Crown Solid Braided Chalk 33⅓%
Mason's, No. 0 to No. 5 ..... 33⅓%
Samson Cordage Works:
Solid Braided Chalk, No. 0 to 3 ..... 40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ₩ gr. 30%

Locks—Cabinet—

Cabinet Locks ..... 33⅓@33⅓&7½%

Door Locks, Latches, &c.—

[Net prices are very often made on these goods.]

Reading Hardware Co. 50%
R. & E. Mfg. Co. 50%
Sargent & Co. ..... 40@40&10%

Elevator—

Stowell's 40%

Padlocks—

Wrought Iron ..... 75&10@5@30@5%
R. & E. Mfg. Co. Wrt. Steel and Brass 50%

Sash, &c.—

Fitch's:
Bronze and Brass 66⅔%
Iron 70%
Ives' Patent.:
Bronze and Brass 62½%
Iron 65%
Wrought Bronze and Brass ..... 55&5%
Wrought Steel 60%
Payson's Signal 80%
Reading ..... 60&10&10@70%

Machines—Boring—

Common, Upright, Without Augers, $3.00
Common, Angular, Without Augers, $2.25

	Without Augers.	
R. & E. Mfg. Co.:	Upright.	Angular.
Improved No. 3	$4.35	No. 1 $5.00
Improved No. 4	3.75	No. 2 3.38
Improved No. 5	2.75	
Jennings'	2.50	3.00
Millers' Falls		5.75
Snell's, Rice's Pat.	2.50	2.75
Swan's, No. 500	5.10	No. 900 6.45

Hoisting—

Moore's Anti-Friction Differential Pulley Block 30%
Moore's Hand Hoist, with Lock Brake 20%
Moore's Portable Pneumatic Hoist 25%

Ice Cutting—

Chandler's 15%

Washing—

Wayne American ..... ₩ doz. $28.00
Western Star, No. 2 ..... ₩ doz. 28.00
Western Star, No. 3 ..... ₩ doz 30.00
St. Louis, No. 41 ..... ₩ doz. 60.00

Mallets—

Hickory ..... 55&5@50%
Lignumvitæ ..... 55&5@50%
Tinners', Hickory and Applewood, doz. ..... 50@55c

Mats—Door—

Elastic Steel (W. G. Co.) 10%

Mattocks—

See *Picks and Mattocks.*

Meat Cutters—

See *Cutters, Meat.*

Milk Cans—See *Cans, Milk*

Mills—Coffee—

Enterprise Mfg. Co. ..... 25@30%
National, list Jan. 1, '94 ..... 30%
Parker's Columbia and Victor ..... 50&10@60%
Parker's Box and Slide ..... 50&10@60%
Swift, Lane Bros. 30%

Mincing Knives—

See *Knives, Mincing.*

Molasses Gates—

See *Gates, Molasses.*

Money Drawers—

See *Drawers, Money.*

Mowers, Lawn—

Net prices are generally quoted.
Cheap ..... all sizes, $1.90@1.95
Good ..... all sizes, $2.25@2.50

	10	*12*	*14*	*16-inch*
High Grade	*4.25*	*4.50*	*4.75*	*5.00*
Continental				60&10&5%
Great American				70&5%
Great American Ball Bearing				60&10&5%
Quaker City				70&5%
Pennsylvania				60&10&5%
Pennsylvania Golf				50%
Pennsylvania Horse				40%
Pennsylvania Pony				45%
Philadelphia:				
Styles M., S., C., K., T.				70&5%
Style A, all Steel				65&10%
Style E, Low Wheel				60&10%
Style E, High Wheel				70&10&5%
Drexel and Gold Coin, low list				50&5%

Nails—

Cut and Wire. See Trade Report.
Wire Nails and Brads, Papered. List July 20, 1899 .85&10@85&10&10%
Hungarian, Finishing, Upholsterers', &c. See Tacks.

Horse—

Nos.	6	7	8	9	10	
A. C.	25¢	23¢	22¢	21¢	21¢	40&5%
Ausable	28¢	26¢	25¢	24¢	23¢	50&10%
Capewell	19¢	18¢	17¢	16¢	16¢	10&5%
C. B. K.	25¢	25¢	23¢	21¢	21¢	40%
Champ'l'n	28¢	26¢	25¢	24¢	23¢	40&10&5%
Clinton	19¢	17¢	16¢	15¢	14¢	30&10&5%
Maud S.	25¢	23¢	22¢	21¢	21¢	50%
Neponset.	23¢	21¢	20¢	19¢	18¢	40%
Putnam	23¢	21¢	20¢	19¢	18¢	33⅓%
Vulcan	23¢	21¢	20¢	19¢	18¢	35&10%
American, Nos. 5 to 16 ₩ ℔						90&95&5%
Jobbers' special brands ..per lb. 8@9c						

Picture

	1½	*2*	*2½*	*3*	*3½ in.*
Brass Head	*.55*	*.60*	*.70*	*.95*	*1.00 gro.*
Por. Head	*..*	*1.10*	*1.10*	*1.10*	*.. gro.*

Nippers, See *Pliers and Nippers.*

Nut Crackers—

See *Crackers, Nut.*

Nuts—

Cold Punched: Off list.
Mfrs. or U. S. Standard.
Square, plain ..... $5.00@5.10
Hexagon, plain ..... $5.30@5.40
Square, C. T. & R. ..... $5.20@5.30
Hexagon, C. T. & R. ..... $5.80@5.90
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square Blank ..... $5.20@5.30
Hexagon Blank ..... $5.80@ .90
Square Tapped ..... $5.00@5.10
Hexagon Tapped ..... $5.60@5.70

Oakum—

Best or Government ..... lb. 6¼c
Navy ..... lb. 5 c
U. S. Navy ..... lb. 5¼c
Plumbers' Spun Oakum 2¾c
In carload lots ¼c lb. off f. o. b. New York.

Oil Axle—

Snow Flake:
1 pt. cans, per doz. $3.00
1 qt. cans, per doz. $4.80
1 gal. cans, per doz. $18.00
5 gal. cans, per doz. $66.00
} 33⅓&10%

Oil Tanks—See *Tanks, Oil.*

Oilers—

Brass and Copper ..... 40&10@50%
Tin or Steel ..... 60&10@65%
Zinc ..... 60&10@65%
Paragon:
Brass and Copper ..... 40&10%
Tin or Steel ..... 60&10%
Zinc ..... 60&10%
Malleable, Hammers' Improved, No. 1, $3.60; No. 2, $4; No. 3, $4.40 ₩ doz. 20%
Malleable, Hammers' Old Pattern, same list ..... 50&10%
Wilmot & Hobbs Mfg. Co:
Spring Bottom Cans ..... 70@70&10%
Railroad Oilers etc. ..... 60@60&10%

Openers—Can—

French ..... doz. 25c
Iron Handle ..... doz. 25@27c
Sprague, Iron Hdle. ..per doz 35@40c
Sardine Scissors ..... doz. $1.75@$3.00
Tip Top ..... per doz $1.75
National, ₩ gro. ..... $1.75@$2.00
Stowell's ..... per doz. 35@45¢
Waldorf, ₩ gro. $8.65

Egg—

Nickel Plate ..... per doz., $2.25
Silver Plate ..... per doz., $3.50

Packing—

Asbestos Packing, Wick and Rope, 15@15½c lb.

Rubber—

Sheet, C. I. ..... 8@12c
Sheet, C. O. S. ..... 9@13c
Sheet, C. B. S. ..... 10@14c
Sheet, Pure Gum ..... 50@70c
Sheet, Red ..... 35c&40c
Jenkins' Standard, ₩ ℔ 80¢ ..... 25@25&5%

Miscellaneous—

American Packing ..... 7@ 10c lb.
Cotton Packing ..... 13@14c lb.
Italian Packing ..... 9@12½c lb.
Jute ..... 3½@4c lb.
Russia Packing ..... 7@11c lb.

Pails—Creamery

S. & C., with gauges.. No 1 $6.50; No. 2, $5.75 ₩ doz.

Galvanized—

Price per gro.

Quart	*10*	*12*	*14*
Water, Regular	*18.00*	*21.00*	*24.00*
Water, Heavy	*24.00*	*27.00*	*30.00*
Fire, Rd. Bottom	*31.00*	*33.00*	*35.00*
Well	*27.00*	*29.00*	*31.00*

Pans—Dripping—

Standard List ..... 50c&10@50c&10%

Fry—

Common Lipped:

No.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.60*	*.75*	*.85*	*.95*	*1.15*

Roasting and Baking—

Regal, S. S. & Co., ₩ doz., Nos. 5, $4.50; 10 $5.00; 20 $5.50; 30, $6.00
Simplex, ₩ gro., No. 40 $30.00; 50, $34.50; 60 $39 00; 140, $83.00; 150, $37.50; 160, $43.00.

Paper—Building Paper—

Asbestos: lb.
Building Felt 3c
Mill Board, sheet, 40 x 40 inches ..4c
Mill Board, roll, thicker than 1-16 inch 3c
Mill Board, roll, 1-16 in. thick and less 3c

	Per roll
Rosin Sized Sheathing:	*500 sq. ft.*
Light wt., 20 lbs. to roll	*$0.32*
Medium wt., 30 lbs. to roll	*$0.47*
Heavy wt., 40 lbs. to roll	*$0.58*
Medium Grades Water Proof Sheathing	*$0.65@1.25*
Deafening Felt, 2, 3 and 4¼ sq. ft. to lb., ton	*$36.00@37.00*
Red Rope Roofing, 250 sq. feet per roll	*$1.65*

Tarred Paper.

1 ply (roll 200 sq. ft.), ton.. $26 00@27.00
2 ply, roll 108 sq. ft. ..... 40@50c
3 ply, roll 108 sq. ft. ..... 60@70c
Slater's Felt (roll 500 sq. ft.) ..50@60c
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.) $2.75

Sand and Emery—

List Dec. 23, 1899 ..50c&10@50c&10c&10%

Parers—Apple—

Advance	₩ doz.	$4.50
Baldwin	₩ doz.	$5.00
Bonanza	each	$5.00
Dandy	each	$7.50
Eureka, 1898	each	$16.00
Family Bay State	₩ doz.	$13.00
Hudson's Little Star	₩ doz.	$4.00
Hudson's Rocking Table	₩ doz	$5.50
Improved Bay State	₩ doz.	$27.00@30.00
New Lightning	₩ doz.	$5.50
Reading 72	₩ doz.	$4.00
Reading 78	₩ doz.	$7.00
Turn Table '98	₩ doz.	$5.50
White Mountain	₩ doz.	$4.00

Potato—

Saratoga ..... ₩ doz. $5.50
White Mountain ..... ₩ doz. $4.50

Picks and Mattocks—

List Feb. 23, 1899 ..... 70@70c&10%

Pigeons—Clay

Markle's Black Birds, f. o. b. factory, per m. $3.75
See also *Traps, Target.*

Pinking Irons—

See *Irons, Pinking.*

Pins—Escutcheon—

Brass 60%
Iron, list Nov. 11, '85.. ..... 60%

Pipe, Cast Iron Soil—

Factory Shipments—Carload lots.
Standard, 2-6 in. ..... 65&5%
Extra Heavy, 2-6 in. ..... 70&10%
Fittings ..... 75&10&5%
NOTE.—*Freight allowed on Carload lots.*

Pipe, Merchant, Boiler Tubes, &c.—

Less than Carloads to Consumers.

Merchant Pipe.	*Black.*	*Galvanized*
⅛ to ½ inch	61%	43%
¾ to 10 inch	68½%	56%
Boiler Tubes		*Up to*
Steel.		*22 feet*

1 to 1¼ inch and 2¼ to 5 inch inclusive 65½%
2 to 2¼ inch, inclusive 60%
6 to 10 inches 59%
Iron.
1 to 1¼ inch and 2¼ in. 43½%
1¾ to 2 inch 45%
2¼ to 12 inch 50%

Casing, Cut Lengths.	*S. & S.*
2 to 3 inch	*53½%*
3¼ to¼ inch	*50%*
4½ to 12½ inch	*61½%*

NOTE.—*Prices are largely nominal owing to scarcity of Pipe. Jobbers are obtaining almost any price they ask.*

Pipe, Sewer—

Standard Pipe and Fittings, 2 to 24 in.
New England 70%
New York and New Jersey 75%
Ohio and Michigan ..... 8 %
Carload lots are generally delivered.

Planes and Plane Irons—Wood Planes—

Molding ..... 40@42½@40&10%
Bench, First quality ..... 45&10@45&10&5%
Bench, Second quality ..... 50&10@50&10&5%
Bailey's (Stanley R. & L. Co) ..... 50&10@50&10&10%
Gage Self Setting 35%

Iron Planes—

Bailey's (Stanley R. & L. Co) ..... 50&10@50&10&10%
Chaplin's Iron Planes ..... 50&10%
Miscellaneous Planes (Stanley R. & L. Co.) ..... 25&10@25&10&10%
Sargent's ..... 50&10&10%

Plane Irons—

Wood Bench Plane Irons ..... 50c&5@30c&10c&5%
Buck Bros. 30%
Stanley R. & L. Co. ..... 50&10@50&10&10%
L. & I. J. White ..... 20&5@25%

Planters, Corn, Hand.

Kohler's Eclipse ..... ₩ doz. $0.00

Plates—

Felloe ..... lb 3¾@4c
Self-Sealing Pie Plates (S. S. & C.), ₩ doz. $2.00 ..... 50%

Pliers and Nippers—

Button Pliers ..... 70c&10@75&1
Gas Burner, per doz., 5 in., $1.15@ $1.90; 6 in., $1.35@$1.45
Gas Pipe.. 7 8 10 12-in.
$1.75 $2.00 $2.75 $5.75
Acme Nippers ..... 50@50&5%
Bernard's:
Parallel Pliers, &c. 35%
Paragon Pliers ..... 50&5%
Lodi Pliers ..... 50&5%
Elm City Fence Pliers 35%
Cronk Hanger Co.:
American Button ..... 75&10%
Cronk's 60%
Improved Button ..... 70&10%
Stub's Pattern 25%
Combination and others 25%
Heller's Farriers' Nippers, Pincers and Tools 50@50&5%
P., S. & W. Tinners' Cutting Nippers, 30@ 50&10%
Swedish Side, End and Diagonal Cutting Pliers 50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds 40%

Plumbs and Levels—

Plumbs and Levels ..... 75@75&10%
Davis Iron, Machinist Nos. 1 to 14 ..... 30%
Davis Iron, Adjustable Nos. 6 to 40 ..... 35%
Dixon's 70%
Pocket Levels ..... 75&10&10@75&10%
Stanley R. & L. Co ..... 70&10@70&10&10%
Stanley's Duplex ..... 25&10@25&10&10%
Woods' Extension 33⅓%

Poachers, Egg—

Buffalo Steam Egg Poachers, ₩ doz., No. 1, $7.20; No. 2, $11.00 No. 3, $11.00; No. 4, $14.50 ..... 50%

Points, Glaziers'—

Bulk and 1 lb. papers .. lb. 10¼c@...
½-lb. papers ..... lb. 11c @...
¼-lb. papers ..... lb. 11½c@...

Pokes, Animal—

Ft. Madison Hawkeye ..... ₩ doz. $1.25
Ft. Madison, Western ..... ₩ doz. $1.75

Police Goods—

Manufacturers' Lists ..... 25@25&5%
Tower's 25%

Polish—Metal—

Prestoline Liquid, No. 1 (½ pt.), ₩ doz. $3.00; No. 2 (1 qt.), $9.72 ..... 40%
Prestoline Paste ..... 40&10%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ₩ doz. 50c; ₩ gr. $4.50; ½ ℔ boxes, ₩ doz. $1.25; 1 ℔ boxes, ₩ doz. $2.25.
U. S. Liquid, 8 oz. cans, ₩ doz. $1.25; ₩ gr. $12.00.
Barkeepers' Friend Metal Polish, ₩ doz. $1.75; ₩ gr. $18.00.
Wynn's White Silk, ¼ pt. cans, ₩ doz. $2.00

Stove—

Black Eagle Benzine Paste, 5 ℔ cans .. ₩ ℔ 10¢
Black Eagle, Liquid, ½ pt. cans ..... ₩ doz. 75¢
Black Jack Paste, ¾ ℔ cans, ₩ gro. $9.00
Ladd's Black Beauty, gr. $10.00 ..... 50%
Joseph Dixon's, ₩ gr. $5.75 ..... 10%
Dixon's Plumbago ..... ₩ ℔ 8¢
Fireside ..... ₩ gr. $2.50
Gem, ₩ gr. $4.50 ..... 10%
Japanese ..... ₩ gr. $3.50
Jet Black ..... ₩ gr. $3.50
Peerless Iron Enamel, ½ pt. cans ..... ₩ doz. $1.50
Wynn's:
Black Silk, 5 ℔ pail ..... each 70¢
Black Silk, ½ ℔ box ..... ₩ doz. $1.00
Black Silk, 5 oz. box ..... ₩ doz. $0.75
Black Silk, ½ pt. liq ..... ₩ doz. $1.00

Poppers, Corn—

Round or Square:
1 qt ..... gro. $7.00@$7.50
1½ qt ..... gro. 9 50@ 10 00
2 qt ..... gro. 10.50@ 11.00

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Potato Parers—

See *Parers, Potato.*

Pots—Glue—

Enameled 15%
Tinned 40%

Powder—

In Canisters:
Duck, 1 lb. each 15c
Fine Sporting, 1 lb each 15c
Rifle, ½-lb. each 15c
Rifle, 1-lb. each 25c
In Kegs:
Duck, 6½-lb. kegs $2.25
Duck, 12½-lb. kegs $4.25
Duck, 25-lb kegs $8.00
Rifle, 6½-lb kegs $4.25
Rifle, 12½-lb. kegs $8.25
Rifle, 25-lb. kegs $16.00
King's Semi-Smokeless:

Keg (25 ℔ bulk)	$6 50
Half Keg (12½ ℔ bulk)	$3.50
Quarter Keg (6¼ ℔ bulk)	$1.90
Case 24 (1 ℔ cans bulk)	$8.50
Half case (1 ℔ cans bulk)	$4.50

King's Smokeless:

	Shot Gun	Rifle
Keg (25 ℔ bulk)	$12 00	$15.00
Half Keg (12½ ℔ bulk)	6.25	7.75
Quarter Keg (6¼ ℔ bulk)	3.25	4.00
Case 24 (1 ℔ cans bulk)	14.00	17.00
Half case 12 (1 ℔ cans blk)	7.25	8 75

Presses—Fruit and Jelly—

Enterprise Mfg. Co. ..... 20@25%

Pruning Hooks and Shears—See *Shears.*

Pullers, Nail—

Cyclops ..... 40@40&10%
Diamond B, No. 2, ca e lots, ₩ doz. $6 00
Diamond B, No. 2, case lots, ₩ doz. $5.50
Giant, No. 1, ₩ doz. $18; No. 2, $12.50; No. 3, $15 ..... 40%
Miller's Falls, No. 3, per doz. $12.00 ..... 15&10%
Pelican ₩ doz. $9.00 ..... 40&10%
Scranton, Case Lots:
No. 1 (large), ₩ doz. $4.50; No. 2 (large), $3.75; No. 3 (small), $3.00; No. 2-B (large), $3.50; No. 3-B (small), $2.00; No. 2-D (large), $4.50; No. 3-D (small) $4 00.

Pulleys—Single Wheel—

Inch	*2*	*2½*	*3*
Awning ..doz.	*$0.45*	*.70*	*.95*
Inch	*2*	*2½*	
Hay Fork, Swivel or Solid Eye ..... doz.			*$1.35@1.50*
Hot House..doz	*$0.65*	*.90*	*1.20*
Inch	*1¼*	*1½*	*1¾*
Screw	*$0.15*	*.20*	*.25*
Inch	*1¾*	*2*	*2½*
Side..doz	*$0.30*	*.40*	*.55*
Inch	*1½*	*1¾*	*2*
Tackle..doz.	*$0.30*	*.45*	*.65*

Stowell's:
Ceiling or End, Anti-Friction 60%
Dunab Walter, Anti-Friction ..... 60&10%
Hay Fork, Anti-Friction, 5-in. Wheel ₩ doz. $12.00 ..... 50%
Electric Light 60%
Side, Anti-Friction ..... 60&10%

Sash Pulleys—

Common Frame: Square or Round End per doz., 1¾ in., 13c.; 2 in., 16c
Auger Mortise, no Face Plate, per doz. 1¾ in., 13c.; 2 in., 18c.
Auger Mortise, with Face Plate, per doz., 1¾ in., 13c.; 2 in., 15½c.